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ABSTRACT

This multi-age integrated teaching unit on outer space was developed by 19 rural teachers (grades K-8) from 12 Gallatin County (Montana) districts to associate all school subjects with a common theme, promote teaching efficiency by focusing on more than one subject at the same time, and increase student excitement. Topics explored by each grade level are space travelers (grades K-1), the solar system (grade 2), the moon (grade 3), galaxies (grade 4), comets (grade 5), exploration in space (grade 6), astronomy (grade 7), and science fiction (grade 8). Core activities are outlined for each grade level in reading/language arts, mathematics, science, social studies, art, music, and physical education. The lesson plans consist of a general focus statement, specific behavioral objectives, designated classroom activities, lists of materials needed, and a teacher log section. Lists of vocabulary words are included in each unit with some coded to a key for word attack through structural analysis. Accompanying each unit is a list of available resources, both material and human. Evaluation worksheets to be utilized when assessing student performance on specific objectives are included. (NEC)

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ED269183

OUTER SPACE

A Multi-Age, Integrated Subjects Curriculum Unit

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Rural Schools Integrated Curricula Project

Generated by the Gallatin County Rural Schools and the Teachers' Resource Center, College of Education, Montana State University

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William D. Hall
Project Director
September 1985

RC015684

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RURAL SCHOOLS INTEGRATED CURRICULA

SUMMARY

Nineteen rural teachers (K-8) from twelve districts located in Gallatin County, Montana, participated in a year long inservice project on developing thematic, multi-age, integrated subject curriculum units.

There were four phases to the project. Phase 1 consisted of three, day long inservice sessions that focused on basic skills in language arts, science and mathematics. These sessions were carried out so that the participants would be better able to incorporate basic skills development into the curriculum units they would be developing later in the project. Phase 2 consisted of learning a process for developing the integrated teaching units and actually developing them. The format followed for developing the units consisted of: 1) selecting a broad based theme; 2) developing a rationale statement justifying why the unit should be taught; 3) identifying appropriate sub-themes for the selected unit theme, by grade level K-8; 4) generating core activities by subject for reading/language arts, mathematics, science, social studies, art, music and physical education. These core activities outlined the possible scope of the unit; 5) writing lesson plans that specifically relate back to the identified core activities. These lesson plans consisted of a general focus statement, specific behavioral obectives, designated classroom activities, materials needed lists and teacher log section; 6) generation of appropriate vocabulary to be taught for each sub-unit; and 7) identification of resources needed, both material and human. The curriculum development phase of the project consisted of seven, all day sessions, with numerous, out of class hours of work. The culmination of this effort were four teaching units, entitled: 1) Gallatin History - Past to Present; 2) Oceans; 3) Outer Space; and 4) Weather.

Phase 3 brought three elementary education professors from Montana State University out to the rural schools to field test the units in the rural schools. Specific parts of each unit developed were selected, and then team or co-taught with the participating rural teachers in the project.

Phase 4 brought selected rural teachers to the campus of Montana State University so they could speak with college classes in teacher education about these types of units, and the benefits of teaching with thematic, multi-age, integrated subject curriculum units.

The benefits of utilizing this type of teaching-curriculum approach include: A more unified approach to teaching and learning, since all of the school subjects are associated to a common theme; efficiency of time because more than one subject can be taught at the same time; multi-age teachers involving all of their students, whatever their grade, in fairly common topics (the theme threads throughout each sub-unit); and increased excitement on the part of the students.

As a result of the Northwest Area Foundation funding the Rural Schools Integrated Curricula Project for $10,000, representative rural teachers of Gallatin County, Montana, have learned a process for developing these kinds of teaching units and copies of each of the four units developed have been distributed to each participating school. In addition, three copies of each unit will also be housed in the Teachers' Resource Center on the campus of Montana State University, for checkout purposes, for teachers located anywhere in the state of Montana.

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PREFACE

By design, this K-8 multi-age, integrated subject teaching unit will always be able to be expanded. The theme, " Outer Space," is broad in scope and when coupled with all of the school subject areas, offers limitless options for expansion.

This unit outlines the theme so that a teacher can begin to teach with it. As the teacher envisions additional lessons and/or ideas, he/she can add to the already existing material. It is suggested that as teachers expand these units, they follow the format provided.

The unit is organized in the following way:

I.	Rationale	The statement justifying the need to teach the unit.
II.	Sub-units	Sub-strands of the original theme organized by grade level or range.
III.	General Objectives	Broad goals for the unit.
IV.	Core Activities	Specific types of activities, by subject, to be developed in the lesson plans. These core activities form the overall broad scope of the unit.
V.	Lesson Plans	Specific plans for teaching, that designate behavioral objectives, procedures to follow, materials and a section for teacher notes.
VI.	Vocabulary	Lists of vocabulary words are included in each unit. Sometimes these words are developed and listed with each sub-unit, and at other times they are listed only at the end of the entire unit. Some vocabulary lists are coded to a key for word attack through structural analysis. This key is located with the vocabulary lists.
VII.	Resources	Accompanying each unit is a list of available resources, both material and human, that can be utilized with the respective unit.
VIII.	Evaluation	A form to be utilized when assessing student performance on specific objectives.

ACKNOWLEDGEMENTS

I wish to especially thank all of the teachers involved in this project, for their tireless efforts and patience as they worked throughout the year. Special thanks to Vanetta Burton, who spent countless hours typing this material into our word processing system. It's amazing that you could keep all of this organized. Special acknowledgement is due Peg Nelson, who assisted in the editing of this material. Without your help this project would have been much more difficult to complete. We all appreciated the contributions made by Dr. Gerald Sullivan and Dr. Paul S. Markovits, who helped make sense out of the language arts and sciences. And, thank you Margaret Brown, Gallatin County Superintendent of Schools, for your cooperation in making this project possible. Thank you all.

We are also indebted to the Northwest Area Foundation, for funding this inservice project. Without your financial support, this project would not have been possible.

W.D.H.

PARTICIPANTS

The following teachers met throughout the 1984/85 school year to participate in the "Rural Schools Integrated Curricula" Project. This inservice project culminated with the development of teaching units on Gallatin History - Past to Present; Oceans; Weather and Outer Space.

Sandy Visser	Amsterdam School
Nancy Drusch	Amsterdam School
Sandra Hale	Anderson School
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UNIT: OUTER SPACE

Grade Levels K-8

Step I. Rationale:

Fascination with outer space has been a part of man since the beginning of time. As time progresses man has learned more about outer space, resulting in a less egocentric approach to this unknown. Space exploration, long a dream of man, is now a reality, and promises to become the greatest and most difficult adventure on which man has ever embarked.

The development of an instructional unit which focuses on outer space will enable students to integrate their academic pursuits so that they will better understand their immediate environment and the universe which they are a small part of.

Step II. Sub-units:

K-1	Space Travelers
2	Solar System
3	The Moon
4	Galaxies
5	Comets
6	Exploration in Space
7	Astronomy
8	Science Fiction

Step III. General Objectives:

1. To provide a learning laboratory in which to focus on man's journey into outer space.
2. To develop students' awareness of Earth as a part of the solar system.
3. To provide students with information which would enable them to make wise decisions about outer space for the future of humanity.
4. To understand man's uniqueness in the manipulation of outer space as part of his environment.
5. To provide an understanding of man's technological progress and his place in the universe.
6. To comprehend the composition and function of our atmosphere.
7. To develop an understanding of our solar system as a part of a much larger galactic system.
8. To demonstrate an appreciation for science fiction.
9. To develop students' awareness of how comets, their motions and location with respect to interstellar matter, provide clues to the story of the galaxy as a whole.
10. To stimulate students' creative ability to hypothesize through an exposure to science fiction.

UNIT: OUTER SPACE

Step IV. Core Activities: Space Travelers (Grades K-1)

A. & B. Reading and Language Arts

1. Select and read various books and periodicals.
2. Read and discuss (report) on various astronauts.
3. Develop word banks, word searches and crossword puzzles using unit vocabulary.
4. Expand reading and writing skills through reading books and writing class and individual reports.
5. Create a time line that depicts the development of space exploration.
6. Write creative stories.

C. Math

1. Have children create one step story problems.
2. Create time line.
3. Use outer space pictures to develop counting and number recognition skills.
4. Practice addition and subtraction computation skills.
5. Introduce concept of place value.
6. Introduce computation with three addends.
7. Introduce concept and terms for greater than/less than (< >).
8. Introduce computational terms.
9. Introduce appropriate measures.
10. Introduce fact families.
11. Introduce estimation of distances.
12. Introduce concept of time.

D. Science

1. Define terms such as: space, space travel, space travelers.
2. Introduce the idea of the need for space exploration.
3. Read and discuss the history of space travel, and the current space program.
4. Construct an imaginary spacecraft.
5. Explore the need for alternative food and water supplies in outer space.
6. Research how people travel in space.
7. Construct a solar system model.

E. Social Studies

1. Describe different modes of space travel.
2. Investigate time lines with reference to space explorers.
3. Demonstrate the orbit of spacecraft around the earth.
4. Develop awareness of current space travelers and space programs.
5. Demonstrate knowledge of the history of the space program.

Step IV. Core Activities: Space Travelers (Grades K-1) continued

F. Art

1. Utilize various mediums to create imaginary space travelers.
2. Create art projects that depict various aspects of space travel.
3. Use photographs of space to develop creative 2-dimensional and 3-dimensional space landscapes.
4. Illustrate space stories.
5. Create art projects that relate to space travel and travelers.

G. Music

1. Listen to recordings that relate to the theme of space travelers.
2. Create original songs about space travelers.
3. Use various forms of music and musical instruments to describe space travel.
4. Create original musical instruments.

H. Health and Physical Education

1. Discuss safety precautions necessary in outer space.
2. Have children simulate the effect of weightlessness on everyday movement.
3. Investigate the different food forms used by space travelers.
4. Create original games from old favorites using space terminology.

UNIT: OUTER SPACE

Step IV. Core Activities: Solar System (Grade 2)

A. & B. Reading and Language Arts

1. Select various books that relate to the solar system theme.
2. Read outer space stories including both fact and fiction.
3. Display various space paraphernalia.
4. Collect and label pictures.
5. Introduce words and phrases.
6. Write creative stories and put together a class book.
7. Use show and tell time to develop the solar system theme.
8. Develop a list of vocabulary words.
9. Present fingerplays and pantomimes.
10. Listen to recordings.
11. Develop experience stories.
12. Solve word searches using "space" vocabulary.
13. Keep a daily journal of events and knowledge gleaned from the unit.

C. Math

1. Create number stories.
2. Construct a graph to show the size of different planets.
3. Compute your weight on other planets.
4. Develop a model that illustrates the distances between planets.
5. Use outer space pictures to develop counting and number recognition skills.
6. Construct pictures of planets, astronauts and space vehicles using geometric shapes.
7. Develop calendar skills.
8. Practice adding and subtracting computation skills.
9. Develop the concept of place value.
10. Develop computation skills with three addends.
11. Develop understanding of greater than/less than.
12. Develop and utilize calculator skills.
13. Develop appropriate measures.
14. Extend fact families to multiplication and division.
15. Develop estimation skills.
16. Develop concept of time.

D. Science

1. Develop a model of the solar system.
2. Set up a science center on the solar system.
3. Construct a graph to show the time it takes planets to revolve around the sun.
4. Construct a sun dial.
5. Represent the position of the moon, sun, and the earth.
6. Demonstrate the rotation and revolution of the earth.
7. Discuss our need for sunlight.
8. Discuss the similarities and differences of various planets.

Step IV. Core Activities: Solar System (Grade 2) continued

E. Social Studies

1. Construct and label models of the solar system.
2. Plan a space trip.
3. Research facts about the solar system.
4. Classify planets according to characteristics such as size, etc.
5. Role play situations.
6. Collect and display newspaper and magazine articles about the solar system.
7. Investigate the hourly and seasonal differences around the world (calendar, sunrise, sunset).
8. Research and discuss how planets got their names.

F. Art

1. Create art projects.
2. Illustrate "space" stories.
3. Utilize various mediums to create a model of the solar system.
4. Construct a mobile of the solar system.
5. Construct a diorama to show a scene on one of the planets.

G. Music

1. Sing songs.
2. Listen to recordings.
3. Write songs.
4. Write lyrics to a familiar song.

H. Health and Physical Education

1. Discuss the ways humans prepare for travel into space.
2. Play games.
3. Improvise on well known games using the unit theme.
4. Imitate movement of planets around the sun.

UNIT: OUTER SPACE

Step IV. Core Activities: The Moon (Grade 3)

A. Reading

1. Select books related to the moon, then create a book display.
2. Read stories about the moon, including both fact and fiction.
3. Listen to recordings about space explorations to the moon.
4. Research the supplies needed on a spacecraft headed for the moon.
5. Create word searches and crossword puzzles using moon vocabulary.

B. Language Arts

1. Keep a journal of knowledge gained from moon unit.
2. Prepare letters of inquiry requesting information from national organizations.
3. Prepare a class book of poems.
4. Write creative stories.
5. Give an oral presentation on an imaginary trip to the moon.
6. Research and write a report on the moon's surface.
7. Create a dictionary of terms.
8. Develop questions for a panel discussion on the pros and cons of spending money for further space exploration.
9. Write a journal with daily entries on your imaginary trip to the moon.
10. Select your favorite astronaut and write his short biography, to be read to the class.

C. Math

1. Have children create number stories.
2. Construct graphs to compare moon size with other planets.
3. Make a chart listing vocabulary words that describe geometric shapes found on the moon.
4. Set up a moon outfitters shop to compute costs, purchases, and money change.
5. Practice adding, subtracting and multiplication skills.
6. Reinforce and develop the concept of place value.
7. Introduce the concept of Roman numerals.
8. Utilize calculators for computation and problem solving.
9. Develop concept of time.
10. Develop estimation of distances.
11. Develop appropriate measurement skills.

D. Science

1. Discuss and describe the characteristics of the moon.
2. On a nightly basis, observe and record on a calendar the shape of the moon.
3. Compile a class list of moon related vocabulary for an experience chart.
4. Develop a model that illustrates the distance between the moon and planets.
5. Introduce and discuss the idea of the need for moon exploration.
6. Research and report on astronauts who have walked on the moon.
7. Develop an appreciation for the kinds of foods taken on a space flight.
8. Introduce and develop the concept of "flight."

Step IV. Core Activities: The Moon (Grade 3) continued

E. Social Studies

1. Develop and act out a commercial for television on space travel to the moon.
2. Compare and construct current maps of the moon to maps of the past.
3. Discuss and evaluate the pros and cons of developing the moon as a country of the future.
4. Develop a time line with reference to early space exploration.
5. Introduce and develop idea of interaction between consumers and producers of goods and services.
6. Develop the concept of the interrelationship between government and people.

F. Art

1. Utilize various mediums to create models of the moon.
2. Make a collage of "earth things" to be put in a time capsule destined for the moon.
3. Design a postage stamp with "moon exploration" as the theme.
4. Create a relief map of the moon.
5. Make lunar footprints.
6. Design stationary using sketches of the moon's surface.
7. Construct a diorama of the first American flag placed on the moon.

G. Music

1. Make a sound effects tape for an outer space movie.
2. Write an original verse about life aboard a spaceship.
3. Learn songs that pertain to the moon.

H. Health and Physical Education

1. Discuss and predict health hazards related to a visit to the moon.
2. Compile a list of recreational activities designed for the moon.
3. Further develop motor skills by imitating moon activities.
4. Learn about "moon dancing."
5. Study methods of preserving food.
6. Prepare moon menus utilizing the four basic food groups.
7. Prepare healthy snacks suitable to be taken on a voyage to the moon.
8. Do physical endurance exercises to prepare for a moon flight.

UNIT: OUTER SPACE

Step IV. Core Activities: Galaxies (Grade 4)

A. & B. Reading and Language Arts

1. Read and report factual information.
2. Distinguish fact from opinion in various assigned readings.
3. Formulate a list of vocabulary words.
4. Demonstrate the knowledge of research skills:
    A. Table of Contents
    B. Glossary
    C. Index
    D. Card Catalog
    E. Periodicals
5. Create word searches and crossword puzzles.
6. Prepare a class book of poems that indicate various themes within the unit.
7. Read for enjoyment.

C. Math

1. Develop the concept of a light year (distance).
2. Scale the distances between or within galaxies using standard measurement.
3. Develop the concept of galactic shapes:
    A. Irregular
    B. Spiral
    C. Elliptical
4. Develop the concept of place value.
5. Develop the concept of expanded notation.
6. Write one and two step story problems.
7. Develop calendar skills.

D. Science

1. Differentiate between a solar system, galaxy and universe.
2. Discuss and develop the concept of galaxies.
3. Develop the concept of stars.
4. Speculate about future uses of space.
5. Develop the concept of gravity and weightlessness.

E. Social Studies

1. Interpret charts and maps of outer space.
2. Create an awareness of current events.
3. Develop an intergalactic transportation system.
4. Speculate how family life would be in space.

F. Art

1. Illustrate space stories.
2. Create art projects that relate to space.
3. Utilize various mediums to create imaginary people.

Step IV. Core Activities: Galaxies (Grade 4) continued

G. Music

1. Listen to recordings that relate to the theme of space.
2. Create original songs about space and galaxies.

H. Health and Physical Education

1. Create original games from old favorites using space terminology.
2. Develop a nutritious space diet.

UNIT: OUTER SPACE

Step IV. Core Activities: Comets (Grade 5)

A. & B. Reading and Language Arts

1. Read articles on the material make-up of comets (i.e., head (coma), (tail) (R).
2. Make outline on the material makeup of comets. (LA)
3. Research, report and illustrate the structure of a comet, showing head and tail, and an orbital pathway. (R/LA)
4. Read about orbital pathways of comets; diagraming three possible orbits. (R)
5. Create word searches and crossword puzzles using comet vocabulary: (LA)
   A. Scientific Terms
   B. Names of Comets
6. Read articles about naming of comets, gravitational pull, comet clouds, radiation pressure. (R)
7. Demonstrate note taking skills based on A & B #6. (LA)
8. Write multiparagraphed paper based on findings in A & B #6, and notes in A & B #7. (LA)
9. Read myths, facts, and theories based on comet's effects on mankind. (R)
10. Write newspaper article reporting the sighting of a comet. (LA)
11. Distinguish between fact and opinion based on A & B #9. (LA)
12. Create poetry forms on comets: cinquain, diamond, limericks.

C. Math

1. Create a scale model for various comets' tails (inches equal miles or kilometers).
2. Calculate potential return schedule for several comets and organize into graph.
3. Create a time line showing appearances of comets: past, present, future.
4. Write story problems based on predictability of a comet's return using all computational operations, one and multi-step.
5. Name several comets, according to scientific process, appearing in a given year. Use differing years for math problems.
6. Using compass, ruler, protractor, draw orbit of several comets - expand use of tools to common math.
7. Introduce place value of billions based on comet length.
8. Introduce concept of ratio based on length of comet's tail, leading into unit on ratio.
9. Convert time measures, i.e., minutes to hours.

UNIT: OUTER SPACE

Step IV. Core Activities: Comets (Grade 5) continued

D. Science

1. Distinguish between comet, meteor, star, and planet.
2. Identify and describe characteristics of coma movement, tail movement, and comet cloud.
3. Differentiate between ways of comet's destruction:
   A. Wasting Away
   B. Contact With Larger Bodies
4. Differentiate between the gravitational pull of the sun and radiational push of the sun.
5. Acquire basic understanding of how comet is seen by mankind.
6. Identify and describe general material make up of a comet.
7. Identify and interpret why comets' pathways cannot be distinguished prior to, and during appearance.

E. Social Studies

1. Develop awareness of newspaper accounts of comet sightings.
2. Research and write report on documented historical changes occuring simultaneously with comet sightings.
3. Research and outline comet appearances.
4. Research and orally report on comet discoverer.
5. Map pathways of a chosen comet.

F. Art

1. Observe night skies for position of stars, planets, moon.
2. Create scale model of universe.
3. Paint pathways of comets.
4. Illustrate stories of human reaction to comet appearances.
5. Make sketching depicting pathway of comet.

G. Music

1. Participate in creative movement as imagination motivates, showing movement of coma and tail.

H. Health and Physical Education

1. Using several students demonstrate movement of coma and tail.

UNIT: OUTER SPACE

Step IV. Core Activities: Exploration in Space (Grade 6)

A. & B. Reading and Language Arts

1. Select and read various books, pamphlets, and periodicals on topics that relate to exploration in space.
2. Develop an ongoing dictionary of space terms learned throughout the unit.
3. Based upon previous reading, student will write a fictional story and in the process develop characters and sequence of events.
4. Use newspapers and magazines to gather information concerning space exploration.
5. Interpret charts and graphs as they apply to space exploration.
6. Organize information through outlining, summarizing, and classifying information.
7. Discriminate between reality and fantasy as they study space.
8. Draw conclusions when given certain facts about space.
9. Use the card catalog to gather information about space.
10. Listen attentively to guest speaker.
11. Communicates orally in a short information speech.
12. Participates in a small group activity designed to share information.
13. Write an essay on speech demonstrating proper sentence structure, correct punctuation, and proper sequence.
14. Utilize video camera, recorder/player, and receiver as class acts out a space drama.
15. Brainstorms future programs of space.
16. Composes letters requesting information from NASA Research Center.
17. Applies reference and writing skills in developing a research paper.
18. Create word searches and crossword puzzles using a space vocabulary.
19. Prepare a class book of poems.
20. Write creative stories.
21. Read and discuss the effects of space exploration on our present environment.
22. Create a time line that depicts the development of space exploration.
23. Listen to a NASA tele-lecture accompanied by slides. ("History of Space Program").
24. Develop a scrapbook and catagorize different space developments.
25. Research material in an effort to prepare for a debate concerning a new space development.

Step IV. Core Activities: Exploration in Space (Grade 6) continued

C. Math

1. Construct a time line.
2. Write 2 step verbal problems which astronauts might encounter in space travel.
3. Compute weight on various planets.
4. Calculate distances.
5. Develop measurement conversion skills based on "space" measure.
6. Converts whole numbers to expanded notation.
7. Identifies circle, radius, chord, diameter and circumference through the study of planets.
8. Identifies congruent and similar figures as they would be found in an imaginary solar system.
9. Organizes data into graphs.
10. Solves word problems using multiplication and division.
11. Develop estimations of distances.

D. Science

1. Describe the theories of planet formation.
2. Develop a model that illustrates the distance between planets.
3. Introduce the idea of the need for space exploration.
4. Research the history of space travel and current space programs.
5. Explore and develop sensory awareness which one might encounter in space.
6. Explore and compare the environment of earth with space.
7. Analyze the interrelationship between man-made and space environment.
8. Discover patterns encountered in space travel.
9. Define a space ecosystem and cite examples.
10. Analyze the interaction and interdependence between space and earth ecosystems.
11. Analyze the adaptive characteristics which enable man to survive in space.
12. Investigate ways that man changes the space environment as a result of his presence.
13. Determine ways of maintaining an ecological balance as man explores space.
14. Explore man's responsibility for his/her future environment in space.
15. Discover and describe the sources of energy which exist in space.
16. Discuss problems involved with developing and using energy sources in space.
17. Learn to use and construct maps, models, and other visual aids which would apply to space exploration.
18. Describe the characteristics and composition of space as science presents it.
19. Differentiate between a solar system, galaxy, and universe.
20. Discuss gravity and weightlessness.
21. Experiment with the principles of flight.
22. Research the history of space travel and the current space program.
23. Speculate about future uses of space.
24. Explore career possibilities in the field of space exploration.

Step IV. Core Activities: Exploration in Space (Grade 6) continued

E. Social Studies

1. Construct diagrams that depict one aspect of the current space program.
2. Design a graph that shows the amount of federal funds appropriated to the space program over the past ten years.
3. Select one astronaut and write a formal paper about his life and/or professional training.
4. Create a flow chart that would explain the development of the NASA space program.
5. Research the dispute over the use of military weapons in the space program.
6. Write and deliver a speech which deals with the space program.
7. Explore the different ways which messages are sent in space.
8. Interpret a map of our solar system.
9. Recognize the complexity of space travel given its vastness.
10. Realize the relationship between rights and responsibilities as it applies to space exploration.
11. Recognize the steps involved in making decisions about space travel.
12. Interpret the change and progress inherent in space exploration.
13. Investigate the interaction necessary to develop goods and services as a future aspect of space travel.

F. Arts

1. Duplicate the basic designs used in space vehicles.
2. Sketch a drawing of one space vehicle.
3. Create a poster that reflects the work of the NASA program.
4. Create a model of a futuristic space vehicle and describe its uses.
5. Design a 2-dimensional object which could be used in space.
6. Design a 3-dimensional object which could be used in space.

G. Music

1. Write the lyrics to a song about space exploration.
2. Create some type of music using your own invented instruments to be used during space travel.
3. Sings simple "two part" rounds using a song about space.
4. Participates in creative movement as imagination depicts space travel.
5. Is aware of program music which tells a story about space.

Step IV. Core Activities: Exploration in Space (Grade 6) continued

H. Health and Physical Education

1. Create a physical game which could be used during space travel.
2. Researches the health requirements of an astronaut.
3. Develop a physical fitness program which would be appropriate for space travel.
4. Plan a physical fitness program for a future space colony.
5. Is aware of the preventive measures necessary to maintain good health in space.
6. Demonstrates an ability to cope with stress.
7. Research accident prevention and emergency health care which would be necessary during space travel.
8. Experiments with a variety of movement conducive to zero gravity.
9. Demonstrates spacial awareness through body movement.
10. Develops original games which could be used during space travel.
11. Demonstrates strength and conditioning through sit-ups, push-ups and isometrics.

UNIT: OUTER SPACE

Step IV. Core Activities: Astronomy (Grade 7)

A. & B. Reading and Language Arts

1. Select and read various books and periodicals.
2. Create word searches and crossword puzzles.
3. Keep a journal of knowledge gained.
4. Prepare letters of inquiry requesting information from national organizations.
5. Expand note taking skills by researching and writing individual reports.
6. Prepare a class book of poems.
7. Write creative stories.
8. Develop and prepare a persuasive speech.

C. Math

1. Compare size, length, and positions of specific stars.
2. Convert standard time to light years.
3. Use compass and protractor for measuring and constructing interplanetary locations.
4. Construct and solve two step story problems.
5. Create and interpret a variety of graphs.
6. Organize statistical data.
7. Introduce scientific notation.
8. Develop geometric concepts of point, line, line segment, ray, parallel and perpendicular.
9. Develop computational skills using multiplication and division of decimals.

D. Science

1. Observe and identify the constellations.
2. Analyze likenesses and differences of various stars.
3. Differentiate between galaxies, solar systems and universe.
4. Describe and experiment with instruments used in astronomy.
5. Discuss astronomy related concepts such as mass, density, time and perpetual motion.
6. Research the history of astronomy, space travel, and the current space program.
7. Discuss the discovery of stars and constellations.
8. Construct and utilize a simple telescope.

E. Social Studies

1. Create and label interplanetary maps.
2. Investigate and record a time line of interplanetary discoveries.
3. Predict and demonstrate how an imaginary community might function in outer space.
4. Compare and contrast cultural lifestyle differences and similarities from early times through intergalactic living.
5. Compare and contrast astronomy and astrology.
6. Describe the historical background leading up to the science of astronomy.

UNIT: OUTER SPACE

Step IV. Core Activities: Astonomy (Grade 7) continued

F. Art

1. Utilize various mediums to create a scale model of a constellation.
2. Create a poster advertising a trip to a heavenly body.
3. Create art projects.
4. Investigate the processes of photography.

G. Music

1. Listen to recordings.
2. Create original music.
3. Make a sound effects tape for an outer space movie.

H. Health and Physical Education

1. Learn and participate in various games.
2. Learn about methods of food preservation.
3. Study the benefits of NASA's conditioning program.
4. Create a physical game that would describe outer space exploration.
5. Develop a physical fitness program designed for an outer space traveler.

UNIT: OUTER SPACE

Step IV. Core Activities: Science Fiction (Grade 8)

A. & B. Reading and Language Arts

1. Select and read various books, pamphlets and periodicals.
2. Develop an ongoing dictionary of space terms learned throughout the unit.
3. Read some of the classics in science fiction, i.e., Jules Verne, Issac Asimov.
4. Based upon previous reading, student will write a science fiction story and in the process develop characters and sequence of events.
5. Discriminate between reality and fantasy as they study space.
6. Use the card catalog to gather information.
7. Listens attentively to guest speaker.
8. Communicate orally on some aspect of space exploration.
9. Participate in a small group activity designed to share information.
10. Utilize video camera, recorder/player and receiver as class acts out a science fiction drama.
11. Brainstorm future life in outer space.
12. Create word searches and crossword puzzles using a space vocabulary.
13. Prepare a class book of poems related to science fiction.

C. Math

1. Create imaginary time line predicting future of space.
2. Write verbal problems dealing with situations found in various science fiction readings.
3. Solve word problems written by students.
4. Using geometric shapes recreate descriptions read in science fiction readings.
5. Using mathematical tools, i.e., rulers, compass, protractors, illustrate science fiction stories to scale written in the class.
6. Calculate profits made from science fiction movies, books, toys, comics.
7. Write and solve story problems based on gross, net, and profit of science fiction market.

D. Science

1. Introduce the idea of the need for science fiction.
2. Research the history of science fiction.
3. Explore and develop the sensory awareness which one might encounter in science fiction.
4. Explore and compare fantasy and reality in science fiction.
5. Explore man's responsibility for his/her future environment as presented in science fiction.
6. Using science fiction material research and communicate how unexplained phenomenon is presented.
7. Describe the characteristics and composition of space as science fiction presents it.

Step IV. Core Activities: Science Ficiton (Grade 8) continued

E. Social Studies

1. Construct diagrams that depict some aspect from science fiction reading.
2. Compare a science fiction space colony social system with a comparable society on earth.
3. Write and deliver a speech which defends the need for law and order as opposed to anarchy in a space colony.
4. Explore the various types of communication presented in science fiction.
5. Hypothesize what life would be like in outer space.
6. Define an ecosystem as presented through the eyes of a science fiction writer.
7. Create a new culture and define its structure, values and life styles. Defend all aspects of the culture.

F. Art

1. Illustrate science fiction books.
2. Design a clothing line for a space colony: utilitarian and social.
3. Create a model of a space community as described in science fiction.
4. Formulate a collage based upon a science fiction book.
5. Create science fiction characters using a variety of art mediums.
6. Express the emotional impact created by lack of color in space.

G. Music

1. Write lyrics to a song that deals with science fiction.
2. Create music using your own invented instruments to be used in a science fiction drama or play.
3. Participate in creative movement as imagination depicts science fiction.
4. Sing a simple two part round using a song from science fiction media.

H. Health and Physical Education

1. Create a physical game from old favorites using science fiction terminology.
2. Develop nutritious space diet.
3. Develop physical fitness program which would be appropriate in a science fiction space colony.
4. Demonstrate an ability to cope with stress in a alien environment.
5. Demonstrate spatial awareness through body movement.

UNIT: OUTER SPACE

Step V. Lesson Plans

Sub-Unit: Space Travelers - Grades K-1

READING/LANGUAGE ARTS: Space Travelers - Grades K-1

ASSIGN. SCOPE OF LESSON STATEMENT Generate interest in space travel through children's literature.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Develop a list of space travelers, past and present, by reading various types of children's literature.	1.1 Select various books on space travel and travelers and display in the classroom. Allow children a given amount of time to examine books.	1.1 Library books on the topic of space travelers - Wright Brothers to Sally Ride and beyond if possible.	1.1 Decorate the room with various materials related to space and air travel - model air planes and rockets, space posters, etc. Books - Bozeman Public Library J/629.4/K THE CHALLENGE OF SPACE Kerrod, Robin ROCKETS AND SATELLITES Branley, Franklin, Nagy illus. ASTRONAUTS IN TRAINING Colby, C.B. MAN IN SPACE TO THE MOON Branley, Franklin M. FAMOUS NAMES IN SPACE EXPLORATION Clark, Paul SPACE MACHINES, Cimpic & Seevers THE TRUE BOOK OF THE MOONWALK ADVENTURE, Friskey, Margaret SATELLITES, Fields, Alice SPACE SHUTTLES, Friskey, Margaret SECRETS OF SPACE, Ridpath
	1.2 Allow children 10-15 minutes to look though reading materials available in the room on unit topic. At the end of allotted time each child will be asked to share one interesting fact they learned about space travel. List on experience chart.	1.2 Experience chart and reading on unit topic.	
	1.3 Set apart an area in the room for books and articles relating just to space travelers. Allow children to examine materials through class discussion generate a list of space travelers from the Wright Brothers to present. Write on experience chart.	1.3 Experience chart, reading materials related to space travelers.	

READING/LANGUAGE ARTS: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Develop writing skills through creation of original stories.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Develop a list of words describing space travel.	1.1 Select and read aloud a book on space travel to the class.	1.1 JOURNEY TO THE MOON, Fuchs, Erich.	1.1 This book is available at the public library J/629.45/F Alternate title: A BOOK OF ASTRONAUTS FOR YOU, Branley, Franklin J/629.1/B THE BERENSTAIN BEARS' SCIENCE FAIR, Berenstain E/BER.
	1.2 Ask children to imagine that they are traveling in space. List words describing what they might feel on experience chart.	1.2 Experience chart, pens.	
2. Write a creative story on space travel.	2.1 Use the words developed in 1.1 and 1.2 to write a creative story where the children imagine that they are a space traveler.	2.1 Experience chart, pens, or writing paper and pencils.	2.1 This could be done on experience chart in Kindergarten or early grade 1, or individually on writing paper if the children's writing skills are developed enough.
	2.2 Illustrate the story developed in 2.1.	2.2 Drawing paper, coloring utensils.	

READING/LANGUAGE ARTS: Space Travelers - Grades K-1

ASSIGN. SCOPE OF LESSON STATEMENT Reinforce discrimination of rhyming words by listing to poems and creating original poetry.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Write an original poem on the topic of space travelers.	1.1 Read a poem (or poems) about topics related to space and space travelers. Have students listen for rhyming words and list them on experience chart.	1.1 Experience chart, pens, poem or poems relating to space travel.	1.1 The discussion on words from the poem could also include sound words and words which tell pictures these could also be listed on experience chart.
	1.2 Help children to create an original poem on experience chart. This might be done by giving them a poem starter, a title, or an opening line. Review 1.1 and and rhyming words.	1.2 Experience chart, pens.	1.2 Introduce the idea of complet form - two lines with approximately the same amount of syllables with rhyming end words. Some children may write two lines. They could then be put together with those of other children to form a larger poem. Refer to poem MARS by Shel Silverstein.
	1.3 Have children illustrate poems and display illustrations on bulletin board with class poem.	1.3 Drawing paper and coloring utensils.	1.3 The poem could be used for penmanship practice, students could also make a book - write the poem in their best penmanship and make a book cover with the illustration.

READING/LANGUAGE ARTS: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Develop vocabulary through word banks, word searches and crossword puzzles.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. List vocabulary words related to unit topic.	1.1 Allow children to look through space books displayed around the room. Give them opportunity to write down words that are unfamiliar to them. List on experience chart.	1.1 Experience chart, writing materials.	1.1 If the children are of kindergarten age or early first grade the vocabulary list would be developed by the teacher.
2. Make word bank, books or dictionaries using unit vocabulary.	2.1 Using vocabulary words developed under Objective 1, make a class dictionary of the words. There should be a written definition of each word and also illustrations of each word.	2.1 Writing materials, paper, covering material for book.	2.1 Make sure the definitions are written by the children - discuss the word meanings and then have the children explain them in their own words.
3. Locate and explain unit vocabulary words in word searches and crossword puzzles.	3.1 Use unit vocabulary words to develop word searches and crossword puzzles.	2.1 Word search and crossword dittos.	3.1 Students may even be able to create their own word searches using large graph paper and markers.

MATH: Space Travelers - Grades K-1

ASSIGN. SCOPE OF LESSON STATEMENT Develop number recognition and counting skills.

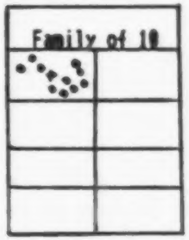
OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Count and write numerals for numbers of objects.	1.1 Have children bring STAR WARS figures to school (make sure they are labeled). Count the number in the classroom. Have the children say the number and write it. This could also be used for sorting and classifying exercises. (How many storm troopers? How many Ewaks?) (How many Darth Vaders?, etc.).	1.1 STAR WARS figures, writing materials.	1.1 STAR WARS figures could be labeled by assigning each child a number and writing that number on one of the feet of each figure belonging to a particular child (use permanent marker, finetip).

MATH: Space Travelers - Grades K-1

ASSIGN. SCOPE OF LESSON STATEMENT Develop word problem solving skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Write and solve verbal math problems using addition and subtraction facts through twelve.	1.1 Use STAR WARS figures and toys to develop verbal math problems. Begin by using STAR WARS figures to write math story problems on experience chart. Write problems together as a class and demonstrate with toys. After some practice allow students to solve on their own on paper.	1.1 STAR WARS figures and space vehicles, writing paper and pencils, drawing paper and coloring utensils, experience chart.	1.1 Be sure to point out some of the necessities in a story problem - talk about question and question mark. Could lead to language arts lesson on sentences and punctuation.
	1.2 Help students to begin writing their own story problems. Could begin by drawing picture problems and then add words to go along with the pictures. Develop a word problem bank using children's math stories. Allow children to share problems with one another. Use STAR WARS figures as manipulatives to solve problems.	1.2 See 1.1.	1.2 These word problems could be written by children or dictated to an adult to be written down.

MATH: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Develop understanding and comprehension of basic addition and subtraction facts.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Practice basic addition and subtraction facts through 10.	1.1 Have students pretend they are launching a rocket and are in the process of countdown. As they count backwards say stop. Use that particular stopping point to develop a family of facts. Have students take turns counting down. Could be played as a game - who can be the first to write the family of facts?	1.1 Chalkboard or experience chart, writing materials - may want to prepare a portion of room to look like mission control - use earphones, etc. for student who is in charge of countdown.	1.1 Example - student stops at T minus 3 seconds and counting. How many seconds have past? 10-3 = 7 How many are left to go? 10-7 = 3 How many seconds all together? 3 + 7 = 10
	1.2 Follow up work where students do worksheets on "Family Number Facts."		
	1.3 Project - Make a poster about the Family of 10 (or any family).	1.3 Children paste on various objects (beans, macaroni, etc.) showing 10's family.	1.3 

SCIENCE: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of our solar system.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create a model of our solar system.	1.1 Show picture of our solar system and name the planets. Discuss concepts such as nearest and farthest from the sun, who are our nearest space neighbors, etc. Allow children to examine poster closely, play games seeing who can remember the names of the planets, etc.	1.1 Large picture or poster of our solar system.	
	1.2 Use a large area such as a football field to demonstrate the size of or solar system. Assign some children to be planets and one to be the sun. Allow other students to be measurers.	1.2 Large play area or open space, (preferably football field), meter sticks, and/or measuring tapes (large construction size).	1.2 SCALE: 150 million km (93 million miles) = 1 m (about 3 1/2 feet) PLANETS AND DISTANCE FROM SUN: Mercury - 40 cm (16 in.) Venus - 70 cm (28 in.) Earth - 1 m (about 3 1/2 ft) Mars - 1.5 m (5 ft) Jupiter - 5.2 m (17 ft) Saturn - 9.5 m (31 1/2 ft) Uranus - 19.5 m (65 ft) Neptune - 30.1 m (100 ft) Pluto - 39.1 m (130 ft)
2. Demonstrate the concept of orbit.	2.1 Use track around football field from 1.2 to demonstrate orbit. The track The track lanes are orbit paths. Discuss how runners must stay in their own lanes and track is almost like a circle. This is how planets orbit around sun. Children could then take turns "orbiting" with teacher in center as sun. Coordinate as P.E. activity.	2.1 Football field with track around.	2.1 Use this to talk about how the farther away from the sun is the longer the orbit of a planet. (It takes Pluto 248 years to go around the sun).

SCIENCE: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of gravity.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Describe the effect of gravity on everyday objects.	1.1 Discuss everyday experiences that illustrate gravity, (toys falling, pouring water, etc.). List on experience chart, children's observations of these. Help to develop a definition of gravity and write on experience chart.	1.1 Toys, various other objects, pitcher of water, glass, experience chart and pens.	1.1 Gravity - the force of attraction by which terrestrial bodies tend to fall toward the center of the earth. May want to use globe to demonstrate this, use small plastic figures with clay on feet and mount on various countries of world. Demonstrate how "up" means away from center of earth and "down" means toward center of earth.
	1.2 Use balls of various sizes and weights. Allow children to take turns throwing them up into the air seeing how high they can get them. Generate into a discussion of the effects of gravity. Which balls went the highest, why? etc. Can you suggest how a rocket can go into space? What has to happen? etc. Use as lead in to a discussion of rockets.	1.2 Balls of various sizes and weights, large play area, experience charts and marking pens.	

SCIENCE: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of the necessity of rockets for outer space travel.

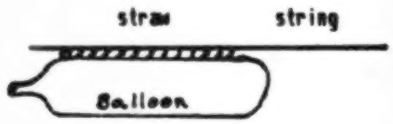
OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Investigate effects of air pressure (air is something).	1.1 Have children inflate balloons and fasten necks shut. Push in on the sides of the balloon. What is pushing back? Use experience chart to record answers.	1.1 Balloons, experience chart and pens, possibly small rubber bands for balloon fasteners.	
	1.2 Collect air in a plastic bag and fasten shut, put bag on floor or table and place book on top. Generate a discussion on properties of air. What is holding the book up? How does this show air is real? Record discoveries on experience chart.	1.2 Plastic bag, book experience chart and pens.	
	1.3 Mold clay around the neck of a funnel and press funnel into mouth of a jug so that there is an airtight seal. Pour water into funnel. What happens? Use this to demonstrate that the jug was not empty. Air is something and takes up space.	1.3 Funnel, clay, jug with small neck opening.	
2. Construct a jet propelled object.	2.1 See Science pg 1, activity 1.2 concerning the pull of gravity on playground balls. a discussion on rockets. If it is so hard to throw a ball because of gravity, how does a rocket get into outer space?	2.1 Experience chart and marking pens.	
	2.2 Have children paint a small paper bag to look like a space capsule or rocket. Blow up a balloon 8 inches long and put paper bag capsule on the end - let the balloon go, observe what happens. Generate a discussion and record some observations.	2.2 Paper bags, paint markers, oblong balloons, experience chart.	2.2 This works on same principle as a rocket. The air rushing out of the back of the balloon creates a force making the rocket move with equal force in the opposite direction. (Newton's third law of motion).

SCIENCE: Space Travelers - Grades K-1

ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of the different types of food that would be used by a space traveler.

OBJECTIVE		ACTIVITIES		RESOURCE MATERIALS		EXPERIENCE CHART
1. Discuss the idea of weightlessness and its effect on environment.	1.1	Review through discussion the effects of gravity. Use experience chart observations from Science pg. 1. Introduce the term weightless - discuss how things would change without gravity. What problems would it cause for the space traveler? Record on experience chart.	1.1	Experience chart, pen.	1.1	Once the earth's gravity has been left behind, everything becomes weightless. Weightlessness could be explained to the children as that feeling they get at the top of the see-saw just before they go down or the feeling they get on an elevator as it goes down.
2. Experience the different types of food that would be eaten by a space traveler.	2.1	Generate a discussion. What kinds of food would an astronaut take on his mission? Why couldn't he take sack lunches?				
	2.2	Introduce freeze dried foods to the children. Allow them to compare weight and space requirements with regular food. Record observations. Allow children to taste food.	2.2	Assortment of freeze dried food and comparable regular food, experience chart and pens.	2.2	Freeze dried food available at most sporting good stores.
	2.3	Use a food dehydrator to demonstrate how the removal of moisture from food changes its appearance, taste, color, etc. Prepare food as a class, record weights, size, color, etc. on experience chart, compare results before and after dehydration.	2.3	Various foods for dehydration, food scale.		

SCIENCE: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of a rocket.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Construct a balloon rocket.	1.1 Cut a drinking straw in half and insert a length of fishing line through it. Fasten one end of the line to a doorknob or other support and tie other end of line to support on the other side of the room. Make sure the straw slides smoothly on the string. Inflate on oblong balloon and tape it securely to the drinking straw, (holding the neck closed). Slide the balloon and straw to one end of the string. Release the balloon and observe what happens as the air inside escapes. What happens? Generate discussion. Discuss ways in which to make the balloon slide faster and farther. Would a bigger balloon work better? Restrict the air escape from balloon opening by rubber banding a straw in place in the neck opening. Observe what happens.	1.1 Fishing line, balloon, drinking straw, tape.	1.1  Pinch end of balloon closed with fingers until ready for release.

SOCIAL STUDIES: Space Travelers - Grades K-1

ASSIGN. SCOPE OF LESSON STATEMENT Develop awareness of the history of the space program.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Make a time line showing major events in space exploration.	1.1 Using various books, periodicals, etc. allow children to create a list of famous space travelers. Write on experience chart with the dates of their travels.	1.1 Assortment of age level books and periodicals relating to space travel. Experience chart and pens.	
	1.2 List the space travelers developed in 1.1 in chronological order. Introduce the idea of a time line and explain. Put names on time line (on large newsprint paper). Have children draw and color pictures of their respective space vehicles and glue on time line.	1.2 Experience chart, pens, newsprint roll, coloring and drawing utensils.	
2. Describe the meaning and function of NASA.	2.1 Generate a discussion on NASA giving a brief history of its function and meaning of the letters. Afterwards have children verbalize their understanding of NASA and record on experience chart. Have them illustrate a poster showing the functions of NASA.	2.1 Experience chart, pens, large drawing paper, and coloring utensils.	2.1 Write to: Teacher's Packet NASA - Education Office Ames Research Center Moffett Field, CA 94035.
	2.2 Have children write letters to the regional NASA office asking for information about the organization.	2.2 Writing paper, pencils, envelopes, stamps.	2.2 See address above - good opportunity to introduce letter writing skills.

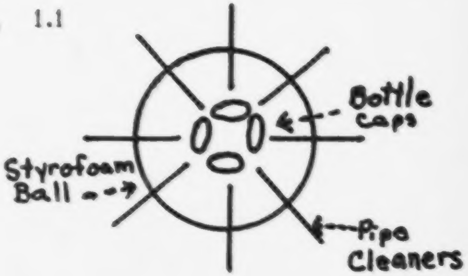
SOCIAL STUDIES: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Develop awareness of the history of the space program (continued).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
3. List space travelers other than astronauts and discuss the ways in which they help our everyday life.	3.1 Generate a discussion on space travelers. Are they just men in space suits? Could we say that an airplane pilot is a space traveler? What about a hot air balloon? Introduce the idea of satellites as space travelers. List all types of space travelers on experience chart.	3.1 Experience chart, pens.	3.1 A visit to the airport would be beneficial here.
	3.2 List ways in which space travelers on experience chart.	3.2 Experience chart, pens.	3.2 Discuss all types of satellites, weather, TV, communications, etc.
	3.3 Have children imagine that they could be any type of space traveler. What would they be? An astronaut? A satellite? A giant hot air balloon? Instruct them to write a creative story about their choice. Have them illustrate each story.	3.3 Writing paper, pencils, white construction paper, markers, crayons.	

SOCIAL STUDIES: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Create interest in using reference materials.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Recite verbally a number of important facts about a particular space traveler.	1.1 Introduce or expand on the idea of alphabetical order. List a number of space vocabulary words on flash cards. Have students play game to arrange them in alphabetical order. (Only to the first letter of each word).	1.1 Blank flash cards, markers.	
	1.2 Introduce the children to a set of junior encyclopedias, either in the classroom or at the public library. Choose a famous space traveler and demonstrate how he/she would be found in the encyclopedia. (Alphabetically by last name). Read and discuss some of the material from the encyclopedia selection with the class.	1.2 Junior encylopedias.	
	1.3 Divide children into groups of 3 or 4, help each group to choose a particular space traveler to find out about. Allow them to use encyclopedias from which to get information. Each group should write down 6-8 important facts about each space traveler.	1.3 Encyclopedias, writing materials, pencils.	1.3 It would be a good idea to use older students, or get parent volunteers to give assistance to each group - helping them with unfamiliar words and to decide important information to share with class.
	1.4 Discuss ways of sharing the information each group has learned. Introduce the idea of giving a news brief. Each group will then develop a news program or brief to be given to the rest of the class sharing the information on their particular space traveler.	1.4 Speaker's podium, writing materials.	1.4 A large refrigerator box could be cut and painted to look like a TV with open area for screen, painted on dials, etc. Each child could then go inside box and speak so that it would look like a TV news broadcast to the children who are in the audience - could be equipped with make believe microphones, etc.

ART: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Develop imagination through creation of space vehicles.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create an imaginary satellite.	1.1 Discuss briefly the use and function of satellites. Have children create a satellite of their own using a styrofoam ball, pipe cleaners, bottle caps, and any other found materials that would be appropriate. After "satellites" are completed they should be spray painted by the teacher with aluminum paint and displayed hanging from the ceiling about the room.	1.1 Styrofoam balls, pipe cleaners, bottle caps, silver paint, string, thumb tacks.	1.1 
2. Construct a rocket ship from cardboard boxes.	2.1 Use various sizes of cardboard boxes to construct a child size rocket for display in the classroom. Divide class into groups of 3-4 to work on various portions of the rocket. (It could be a 3 stage rocket, each group would work on a particular stage, assign one group to draw a control panel maybe use spools for knobs, etc. Each group could design and paint their portion and then assemble to make rocket.	2.1 Cardboard boxes of various sizes, tempera paint, drawing pencils, markers, scissors.	2.1 An alternate method would be to use a single large box like a range or refrigerator box and decorate it inside and out to look like a space vehicle.
3. Create a wood sculpture of a rocket or other space vehicle.	3.1 Provide wood scraps, nails of various sizes, tongue depressors, etc., and allow children to create a space vehicle.	3.1 Wood scraps, hammers, nails, popsicle sticks, tongue depressors, and any other appropriate materials.	

ART: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Create two dimensional art forms.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Make a life size picture of each child in a space suit.	1.1 Cut a piece of newsprint large enough to make a life size body outline of each child. Allow the child to design and draw a space suit on his body outline.	1.1 Newsprint, pencils, markers, crayons.	
2. Create an imaginary scene from outer space.	2.1 Pass out a piece of black construction paper to each child. Place a large drop of white tempera paint on the paper. Give each child a straw and have them blow the tempera around the paper into a design that might be seen from a spaceship window. Allow the white to dry thoroughly before doing the same thing with the silver tempera.	2.1 Black construction, paper, white tempera, silver tempera, straws.	

MUSIC: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Create interest in singing songs.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Sing the song "Sally Go Round the Sun."	1.1 Play the tune to "Sally Go Round the Sun" while children listen. Introduce them to the words and practice singing.	1.1 Piano, words and music to "Sally Go Round the Sun."	1.1 This can be found in most elementary or early childhood education song books.
	1.2 Discuss the astronaut Sally Ride and her importance to the world of space travelers - change the traditional words to: Sally go 'round the sun Sally go 'round the moon Sally go 'round the whole wide world On a Sunday Afternoon Whoops!		

HEALTH AND PHYSICAL EDUCATION: Space Travelers - Grades K-1
ASSIGN. SCOPE OF LESSON STATEMENT Develop game playing skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Play the game "Astronauts and Spaceships."	1.1 The group is divided into 2 equal teams. One is the Astronauts and one is the Spaceships. The playing area has a center line between two base lines. The teams line up on each side of the center line. When the teacher holds up the name of a team, that team must run to their base line while the opposing team chases them. If a child is caught, he must be on the team of the one who catches him. After play they all return to the center line. Game continues until a set time is up or all the players are on one side.	1.1 Large playing area, flash cards with team names on them.	

UNIT: OUTER SPACE

Step V. Lesson Plans

Sub-Unit: Solar System - Grade 2

READING: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Create an interest in the solar system.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Read and discuss books on the solar system	1.1 Have the children read various books that relate to the solar system.	1.1 THE SUN, THE MOON AND THE STARS Freeman, Mae and Irma.	1.1 THE SUN: OUR NEAREST STAR Branley, Franklin M.. I CAN READ ABOUT PLANETS Schecter, Darrow. DO YOU KNOW ABOUT STARS? Freeman, Mae Blacker. GOODNIGHT MOON, Brown, Margaret Wise. READ ABOUT SPACE, Seevers, James A.. MOONBEAM FINDS A MOON STONE Wassermann, Selma and Jack. YOU AND SPACE NEIGHBORS Lewellen, John. MAGIC MONSTERS EARN ABOUT SPACE Moncure, Jane B. THE NIGHT STELLA HID THE STARS, Radley, Gail.

LANGUAGE ARTS: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Create an understanding of "space" vocabulary.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Develop a "space" vocabulary.	1.1 Make an astronomical ABC book. A is for astronaut, B is for blastoff, etc. Illustrate the books.	1.1 Paper, pencils, crayons.	1.1 Each child can make an individual book or one page for a class book. Investigate compound "space" words: moonbeam, moonlight, sunlight, sunbeam. Children can make up their own compound words.
	1.2 Collect a list of extraterrestrial words and keep a class list. Use these words for alphabetizing, writing sentences, and writing descriptions.	1.2 Chart paper.	1.2 Use these words to develop word searches and crossword puzzles.
	1.3 Some words can be written so they show their meaning. "Draw" words about the solar system.		1.3 The names of two planets are very much alike. Move the letters of one of these planets and you can spell the name of the other planet if you also change one letter. What are the two planets? Saturn & Uranus.

LANGUAGE ARTS: Solar System - Grade 2

ASSIGN. SCOPE OF LESSON STATEMENT Provide learning experience through listening.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Listen to and discuss poetry.	1.1 Have the children listen to "The Planet of Mars."	1.1 "The Planet of Mars" by by Shel Silverstein.	1.1 "The Planet of Mars" by Shel Silverstein. On the planet of Mars They have clothes just like ours, And they have the same shoes and same laces, And they have the same charms and same graces, And they have the same heads and same faces... But not in the very same places.
	1.2 Discuss the selection.		
	1.3 Illustrate the poem.	1.3 Paper, pencils, crayons.	
	1.4 Display the illustrations on a bulletin board.		

READING/LANGUAGE ARTS: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop creativity through use of a story.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Read and discuss story.	1.1 Read the story, "Why The Sun and The Moon Live in The Sky."	1.1 African folktale, "Why The Sun and The Moon Live in The Sky." (Ginn 720 Level 6, ONE TO GROW ON).	
	1.2 Discuss the story.		
2. Act out the story in pantomime.	2.1 Choose small groups of pupils to pantomime the story.		
3. Write creative stories.	3.1 Have students make up their own legendary accounts of why the sun and the moon live in the sky.		
	3.2 Discuss what the sun, moon and the water might have looked like.	3.2 Paper, crayons, watercolors.	3.2 Give the pupils the option of presenting these characters in human form. Suggest that some children might want to include stars, planets, and other natural objects in their pictures.
	3.3 Illustrate the stories.		
	3.4 Display pupil's work.		

READING/LANGUAGE ARTS: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop experience stories.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Read and discuss a story.	1.1 Read the story "The Day the Spaceship Landed" by Beman Lord.	1.1 "The Day the Spaceship Landed" by Beman Lord.	
	1.2 Discuss the story.		
2. Write creative stories.	2.1 Have the children write letters for the astronauts to take back to their planet.	2.1 Pencils, paper, experience charts.	
	2.2 Write letters to "friends" in outerspace.	2.2 Paper, pencils.	
	2.3 Have the children write their own stories "The Day the Spaceship Landed."		
	2.4 Illustrate the stories.	2.4 Crayons, paper, markers.	
3. Listen to and discuss poetry.	3.1 Read "Stars" by Carl Sandburg.	3.1 "Stars" by Carl Sandburg.	3.1 "Stars" by Carl Sandburg The stars are too many to count. The stars make sixes and sevens. The stars tell nothing - and everything. The stars looked scattered. Stars are so far away they never speak when spoken to.
	3.2 Discuss the poem. Ask: If the stars could speak, what would they say? Do you ever wonder how far away the stars are?		
	3.3 Relate stories orally and record stories on an experience chart.	3.3 Experience chart, markers.	

READING/LANGUAGE ARTS: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop experience stories (continued).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
4. Write creative prose and poetry.	4.1 Discuss with the students what they think it feels like to float in space.		4.1 Use common poetic forms such as free verse or couplet.
	4.2 Have them put their thoughts in writing.	4.2 Paper, pencil, crayons, markers.	
	4.3 Illustrate their writings.		4.3 Draw pictures of what they think space looks like to an astronaut in a spacecraft. Make a list of adjectives under the pictures.

LANGUAGE ARTS: Solar System - Grade 2

ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of diary (journal).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Record sequence of events.	1.1 Have the children keep a daily journal of events and knowledge gained from the unit. 1.2 Illustrate the daily journal. 1.3 Bind the journal into book form. 1.4 Share the journals with other class members or grade levels.	1.1 Paper, pencils, construction paper, crayons, markers.	

LANGUAGE ARTS: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Provide listening enjoyment of a book.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Listen to a book read by the teacher.	1.1 Have the children listen to a book read by the teacher.		1.1 SPACE CAT, Todd, Ruthven. SPACE CAT MEETS MARS, Todd, Ruthven. THE SPACE SHIP UNDER THE APPLE TREE, Siobodkin, Louis. To provide motivation for students' independent reading during this unit, pre-cut stars, rockets, planets, etc. from colored construction paper. Each time a child reads a book, have them write their name, title, and author on one of the cutouts. Display around the room.
	1.2 Discuss the story each day focusing on sequence of events, main idea and vocabulary development.		
	1.3 Children may draw pictures to correlate with the story.		

MATH: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Create ideas for practicing number facts and skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create verbal addition and subtraction problems.	1.1 Have the students orally give math problems using facts to 10.		1.1 Urge students to remember key words for different operations: and, how many, less than. Suggestion: pair students to edit each others work. Editing goal: to write a complete and clearly stated problem.
	1.2 "Show" the math problem using manipulatives.	1.2 Counters - lima beans, sticks.	
	1.3 Write the number sentence.	1.3 Chalkboards, chalk, paper, pencil.	
2. Review counting and number recognition skills.	2.1 Have the children use pictures relating to outer space to practice counting to 20.	2.1 Space pictures.	2.1 Practice number and number word recognition skills using countdown to zero (blast-off).

MATH: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop the understanding that planets vary in size.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Graph planets according to relative size.	1.1 To scale down the size of the planets use any unit of measurement. The smallest unit can be the smallest planet (you might use 1 cm as 1 unit).	1.1 Paper, pencil, scissors, metric ruler.	
	1.2 Mark off 1 unit on a piece of paper. This represents the diameter of Mercury. Make a circle from this diameter.		1.2 Which planet is the largest? Which planet is the second largest? Which planets are about the same size as the earth?
	1.3 Cut out and label each planet using table at right.		1.3 Units for Diameters: Venus 2.4 Uranus 9.4 Earth 2.6 Neptune 9.9 Mars 1.4 Pluto 1.3 Jupiter 28.6 Sun 279 Saturn 24.2
	1.4 Discuss and graph results.		

MATH: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of graphs.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Construct a graph to compare the orbits of nine planets.	1.1 Have the children construct a graph to show the length of time it takes each planet to go around the sun.	1.1 Graph paper chart which lists the length of orbit for each planet.	1.1 Mercury: 88 days Venus: 225 days Earth: 365 days Mars: 687 days Jupiter: 12 years Saturn: 29 years Uranus: 84 years Neptune: 165 years Pluto: 248 years
	1.2 Discuss the graph.		

MATH: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop concept of shapes.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Assemble pictures that relate to the theme focusing on shapes.	1.1 Have the children select various shapes.	1.1 Pre-cut shapes cut from various colors of construction paper. Use the shapes: square, circle, rectangle, triangle, and oval. Glue, construction paper.	
	1.3 Glue your pictures on a large sheet of paper.		
	1.4 Use show and tell time to orally tell a story about the pictures.		
	1.5 Teacher can record the stories on an experience chart.	1.5 Experience chart, pens.	

MATH: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop calendar skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Identify specific dates on a calendar.	1.1 Display a large copy of the current month's calendar.	1.1 Current months calendar.	1.1 Calendar skills are used daily in opening activities. This activity is meant to expand upon daily routine.
	1.2 Have the students locate on the calendar the series of dates for a space event (launch).	1.2 Newspaper and magazine articles.	1.2 Locate on the clock the times for the events in a manned launch.

MATH: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop concept that student's weight would differ on other planets.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Compute each student's weight on other planets.	1.1 Weigh each child on a scale. 1.2 Compute each student's weight on Sun, Moon, Jupiter, Mars.	1.1 Scale.	1.2 Earth Weight x Surface Gravity = Sun - x 28.00 = ___ Moon - x 0.16 = ___ Jupiter - x 2.39 = ___ Mars - x 0.39 = ___ Utilize calculator skills. Basic instruction on using a calculator may be needed for some or all of the students.

SCIENCE: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop interest in unit - solar system.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Observe the night sky and discuss observations.	1.1 About a week before starting this unit, have the children observe the sky each night.		1.1 Form skywatching groups and arrange to meet at one another's homes on a clear night. Invite a parent/teacher (amatuer astronomer) to speak to the group.
	1.2 Have them make observations from the same location at the same time each evening.		1.2 Spot a planet. Watch it for a few nights in a row. It will move westward with the whole sky.
	1.3 Draw pictures, make notes and record questions in a notebook.	1.3 Notebooks, pencils.	1.3 Consult an almanac to help you know where to look for Mars.
	1.4 The children can display their work on a bulletin board with the caption "What Did You See Last Night?"		1.4 Since the names of the planets are derived from mythology, select an interesting myth in which one of these names is used. Read or tell the story to the students.
	1.5 Discuss observations.		

SCIENCE: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Create an understanding of rotation and revolution.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Demonstrate the position of the moon, sun and earth.	1.1 Using three small balls of clay have the students represent the position of the moon, the sun, and the earth.	1.1 Clay.	
	1.2 Demonstrate the rotation and revolution of the earth.		1.2 The earth and the moon are always in motion. Their motions are called revolution and rotation. The movement of the earth and the moon in their orbits is called a revolution. It takes the earth a year to make one revolution around the sun. Most bodies in space also spin. This full turn is called a rotation. The earth makes one full rotation every 24 hours.

SCIENCE: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of orbits.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Demonstrate the orbits of Mars and Earth.	1.1 Provide a meter stick and chalk. Choose one child to represent Sun, one to represent Earth, and a third to represent Mars.	1.1 Signs for Earth, Sun, and Mars, meter stick, chalk, blacktop or paved area.	
	1.2 Have Sun stand in a central spot, with enough room for the Mars orbit (6 meters in radius).		
	1.3 Have Earth use the meter stick to measure a distance 4 meters from the Sun. Mark a circle that is about 4 meters from the Sun all the way around (Earth's orbit).		
	1.4 Have Mars measure 6 meters from Sun. Draw Mars orbit 6 meters from Sun (Mar's orbit).		1.4 Mars takes twice as long as Earth to make one trip. As time permits, choose various groups of three to demonstrate and compare the the revolutions of Earth and Mars.
	1.5 When everything is set, have Sun call "Go!" At the signal Earth and Mars begin to move in their respective orbits (counter-clockwise).		

SCIENCE: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of night and day.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Demonstrate what causes night and day.	1.1 Shine the light on the globe. (The light may be thought of as the sun).	1.1 Globe of the earth, tape, bright light, dark room.	1.1 Explain that the earth rotates as it moves around the sun. The same side of the earth is not always facing the sun. Each part of the earth gets light from the sun for part of each day.
	1.2 Find where you live on the globe. Stick a piece of tape at this spot on the globe.		
	1.3 Turn the globe slowly counter clockwise. Turn the globe 1 full turn.		
	1.4 Discuss what happened to the part of the earth where you live.		

SCIENCE: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of seasons.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Demonstrate what causes seasons.	1.1 Put the lamp on the table. Plug the cord into an electric socket. Turn on the lamp. (The lamp may be thought of as the sun).	1.1 Lamp (without a shade), table, globe of the earth.	
	1.2 Hold the globe about 3 feet away from the lamp. Lean the globe towards you.		1.2 What part of the earth has summer? What part has winter?
	1.3 Carry the globe in a circle halfway around the "sun." Always keep the top of the globe pointing toward the same wall.		1.3 On what part of the earth would you expect little change in the seasons?

SCIENCE: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop concept of seasonal changes.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Discuss the seasonal changes.	1.1 Have the children discuss the earth's motions.	1.1 Globe of earth, light.	1.1 NOW IT'S FALL; I LIKE WINTER; SPRING IS HERE; ON A SUMMER DAY, Lenski, Lois.
	1.2 Discuss hourly and seasonal differences around the world.		1.2 The seasons are caused by the tilt in the earth's axis as it revolves around the sun. In summer, the Northern Hemisphere is tipped toward the sun, receiving its strong direct rays. In winter, Northern Hemisphere is titled away from the sun, receiving slanting rays which are weaker and indirect.
	1.3 Have the students investigate these differences.		1.3 Find old tales and nature myths of different national origins that explain the reasons of seasons. Can you make up your own nature myth?
	1.4 Locate an area that is having summer when they are having winter.		
	1.5 Create a Summer/Fall/Winter/Spring mural. Illustrate what each season means to you.	1.5 Large sheets of butcher paper, catalogs, magazines, glue, crayons.	

SCIENCE: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of a sundial.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Construct and learn to read a sundial.	1.1 In the morning, have the children put a piece of cardboard in a place where the sun will shine on it all day.	1.1 Cardboard, nail, glue, clock, sunny day. You could also use a short pencil placed upright in a lumb of clay.	1.1 Explain to the children that sundials are one way people used to tell time before clocks were made.
	1.2 Glue the head of the nail near the edge of the cardboard. Make sure this edge always faces south.		1.2 Use a shadow stick and stones to make a "rock clock" to measure time. "Rock clocks" were the first simple sundials. Push a straight stick into the ground. On a sunny day, use small stones to mark the end of the shadow the stick casts. Check the time on a clock. Put the hour number on the rock. Then come back every hour to finish your rock clock.
	1.3 Every hour, trace the shadow made by the nail. 1.4 Write the time next to each tracing. 1.5 Look at the sundial on another sunny day.		

SCIENCE: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of the sun's importance.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Discuss the importance of the sun.	1.1 Have each child bring in weather reports (one for each day) clipped from the local newspaper.		1.1 Discuss the importance of the sun to a project being conducted in the science area, grow plants-sun and shade). What relationship does this have to recreation, agriculture, etc.? Feel objects that are warmed by the sun.
	1.2 Make a weather chart.	1.2 Weather chart.	
	1.3 Graph results.	1.3 Graph paper.	
2. Compute the number of sunlight hours.	2.1 Have the children compute the number of sunlight hours for 1 week.		2.1 Observe the location of the sun at different times of the day - morning, noon, and in the afternoon. Observe where sunlight comes into the school building at different times of the day and make a record of the hour.
	2.2 Each day have the students note the time of sunrise and sunset.		
	2.3 Graph and discuss results.	2.3 Graph paper, pencils.	
3. Demonstrate the way the sun shines on the earth.	3.1 Darken the classroom.	3.1 Basketball, flashlight.	
	3.2 Have one student hold a basketball. Ask another student to stand 5 feet from the first student and shine a flashlight directly at the basketball. (The basketball is the earth and the flashlight is the sun).		3.2 On which part of the earth is it day? On which part is it night?

SCIENCE: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of craters.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Make craters.	1.1 Pour the sand into the pan. Make it about 6 centimeters deep.	1.1 Damp sand, several small rocks, flat pan, ruler.	
	1.2 Use the ruler to smooth the surface of the sand.		
	1.3 Hold a rock about 20 cm. above the sand.		
	1.4 Drop it into the sand. Do this with the other rocks. Make sure you drop the rocks in different places in the sand. Carefully pick each rock out of the sand.		

SOCIAL STUDIES: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop concept of solar system.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Locate and discuss solar system articles. (Both newspapers and magazines).	1.1 Have the children bring newspapers articles to class that relate to the unit theme.	1.1 Newspapers, magazines.	1.1 Make a list of words about outer space found in articles. Look up the definition of any words you do not know. Write the definition next to the word.
	1.2 Display a current events "space" bulletin board.		1.2 Check local newspapers for the locations and viewing times of visible planets.
2. Display a bulletin board that represents the varying sizes of the planets.	2.1 Use balloons or paper cutouts of varying sizes to represent the solar system.	2.1 Balloons, tagboard, markers, poster of solar system.	2.1 "Bulletin Board Set" by Trend - Solar System #T-804 $4.95 Show orbits of planets.

SOCIAL STUDIES: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop concept of differences of planets.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Read books and research information about the planets.	1.1 Have the students read books on the planets. Each student becomes an expert on one planet.		1.1 MY FIRST BOOK ABOUT SPACE A QUESTION AND ANSWER BOOK, Moche, Dinah L. EARTH AND SPACE, Tannenbaum, Harold. STARS AND PLANETS, (a Golden Stamp Book). DISCOVERING THE STARS, Santrey, Lawrence. SVE Filmstrilp "Moon, Sun and Stars" (Children's Press). Troll Associates filmstrip and cassette "The Sun."
	1.2 Read about their planet and write a report.	1.2 Paper, pencil.	
	1.3 Compare life on earth vs. life on another planet.		
	1.4 Write space guidebooks to individual booklets.	1.4 Paper, construction paper.	1.4 Each planet guide can take groups on a "tour" of the planet, pointing out its distinctive features.
	1.5 Construct a "space" family apartment. Compare it to an "earth" family apartment.	1.5 Boxes, paper, paint, markers.	
	1.6 Construct a neighborhood on "Mars."		

SOCIAL STUDIES: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of planning for a trip.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Organize a space trip.	1.1 Have the children write a child's eye view of a trip into space.	1.1 Paper, pencil.	1.1 Role play situations relating to the theme. Discuss the way humans prepare for travel into space (astronauts).
	1.2 List the materials and clothing you will need to take.	1.2 Paper, pencil.	1.2 Planning the trip involves reading, gathering facts, listing unsolved problems, organizing materials etc.
	1.3 List the food you will need. Prepare a "space" menu for each day of your trip.		1.3 Learn about the planets as you visit them on your "space" trip. Classify the planets according to size, distance from sun, etc. List unusual characteristics of each planet; i.e., Jupiter has red spot, Saturn has rings, Mars glows red.
	1.4 Design a "space wardrobe" for the trip.	1.4 Paper, crayons, markers, glue.	

ART: Solar System - Grade 2

ASSIGN. SCOPE OF LESSON STATEMENT Create an art project relating to the solar system.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Construct a planet mobile.	1.1 Trace planets on the white paper. Make a copy of the sun too.	1.1 Wire coat hangar, white paper, string, crayons.	
	1.2 Cut out the planets and the sun.		
	1.3 Color them on both sides.		
	1.4 Punch a hole through each cutout and tie a string through it.		
	1.5 Hang the sun cutout on the far end of the hanger.		
	1.6 Hang each planet in its place on the hangar.	1.6 Drawing which shows the correct order of the planets from sun.	
2. Write "secret" sun messages.	2.1 Use lemon juice or white vinegar and a small paintbrush or cotton swab to write a message on white paper.	2.1 Lemon juice, white vinegar, paintbrush or cotton swab, white paper.	
	2.2 Let it dry. Put the paper in the sun.		
	2.3 Watch the secret message appear.		
3. Create a crayon resist picture.	3.1 Draw picture relating to the solar system (sun, stars, planets, etc.).	3.1 Wax crayon, paper, brush, watercolor paints, water container.	
	3.2 Color drawing or design heavily with crayons, allowing areas of paper to show.		
	3.3 Cover the entire surface of the paper with watercolor paint. The paint will be absorbed by the uncolored paper and resisted by the wax crayons.		3.3 If light colored or white crayons are used, a dark watercolor wash will be most satisfactory.

ART: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop artistic expression.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create papiermache models of the solar system.	1.1 Have children make papiermache models of Earth, Mercury, Venus and the other planets. 1.2 Suspend models from ceiling.	1.1 Papiermache, balloons, newspaper, model of planets.	
2. Create clay models of the solar system.	2.1 Have the children make models of the planets using clay.	2.1 Clay.	2.1 Have the students use clay to construct a model showing the features of the moon's surface.
3. Create a diorama and apply information about the planets.	3.1 Make a diorama to show a science on one of the planets. Make use of the known facts about the planet you choose.	3.1 Shoe box, paints, crayons, markers, clay, construction paper, glue.	3.1 Use imagination too, but let it be guided by facts.
4. Draw and color the nine planets.	4.1 Have the children draw and color the nine planets, each on a sheet of black construction paper, with colored chalk.	4.1 Model of solar system, black construction paper, colored chalk, pencils.	
	4.2 Label each drawing.		4.2 This activity also gives practice in writing and spelling planet names.
5. Construct a mural.	5.1 Have the children make a mural of the solar system.	5.1 Large sheets of butcher paper, paints, crayons, markers.	

ART: Solar System - Grade 2

ASSIGN. SCOPE OF LESSON STATEMENT Create an opportunity for artistic expression.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create a spinning sun.	1.1 Draw a circle on the yellow construction paper right to the edge of the paper. Then draw a smaller circle in the middle of the large circle. Draw a design around the edge of the circle. (The circles can be drawn with a compass).	1.1 9"x9" yellow construction paper, scissors, compass, needle and nylon thread, pencil.	
	1.2 Cut out both circles and then trim the small inside circle a bit smaller so it will swing in the middle of the large circle.		
	1.3 Write or draw something on the center circle.		1.3 Write a "sun verse" such as "smiles are sunshine" or "share your smile."
	1.4 Hang the sun.		

ART: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Create art projects relating to the sun.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create sun prints without a camera.	1.1 Choose an object you want to print.	1.1 Sun print paper, sunny day, heavy paper, objects such as: keys, leaves, flower petals.	1.1 Sun print paper - write to: Discovery Corner Lawrence Hall of Science University of California Berkeley, CA 94720.
	1.2 Place a piece of cardboard in the sun.		1.2 The sun print papers are sensitive to light. Keep them covered until you are ready to use them.
	1.3 Put a piece of sunprint paper on the cardboard (blue side up).		
	1.4 Place the object on the sun paper.		
	1.5 Wait! In about 5 minutes, the sun print paper will turn white.		
	1.6 Pick up the object. Rinse the sun print paper with water for about 1 minute. (The H20 sets the pattern).		
	1.7 Dry the print picture on a flat surface.		
	1.8 Paste each sun print on a piece of heavy paper. Leave a border frame.		1.8 The prints make perfect presents.

MUSIC: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Experience musical activities.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Listen to recordings that relate to the solar system theme.	1.1 Have the children listen to songs that relate to the solar system.	1.1 Records.	1.1 Records: "Countdown" - Hap Palmer, "It's A Small World"; "When You Wish Upon A Star"; "You Can Fly! You Can Fly! You Can Fly" - Disney, "Twinkle Twinkle Little Star"; "Aquarius"; "Hey Diddle Diddle"; "Autumn" - George Winston - Sun, Moon, Stars.

MUSIC: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Experience a musical game.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Participate in a group musical activity.	1.1 The sun, moon and chimney pot take up positions in the center of the circle.	1.1 Standing circle formation.	1.1 Sally go round the sun Sally go round the moon Sally go round the chimney pot Every afternoon boom!
	1.2 As the song is sung, one student, "Sally" runs into the circle and goes around the sun, moon and chimney pot, matching his action to the words as they occur in the song. "Sally" tries to get back to his position in the circle, landing in place on the "Boom!"		
	1.3 The student next to him becomes the next "Sally."		1.3 Often the child's own name is inserted instead of Sally.

HEALTH AND PHYSICAL EDUCATION: Solar System - Grade 2

ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of how the planets move.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Demonstrate the movement of the planets around the sun.	1.1 The students in the class will act as parts of a solar system model. There will be nine planets, one moon and one sun.	1.1 Paper, crayon, hole punch, string.	
	1.2 Use a crayon to write the name of your part in the model. Print the name in large letters on a piece of paper.		
	1.3 Use a hole punch to make two holes in the paper. Put a piece of string through the holes. Tie the string to make a loop. Hang the sign around your neck.		
	1.4 The teacher will tell the students where to stand and how to move.		

HEALTH AND PHYSICAL EDUCATION: Solar System - Grade 2
ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of how the planets move (continued).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	1.5 The planets should all walk around the sun at the same speed. The moon walks around the earth at it moves. Everyone will stop walking when the earth is back where it started. (It takes the earth a year to go around the sun once).		1.5 A year is the time it takes a planet to go around the sun once. Each planet's year is different. 1) Which planets did not make a complete orbit around the sun during one earth year? 2) Which planets completed more than one orbit around the sun during one earth year? Answers: 1) Mars, Jupiter, Saturn, Uranus, Neptune, Pluto. 2) Mercury, Venus. PLANET-LENGTH OF 1 ORBIT Mercury 88 days Venus 225 days Earth 365 days Mars 2 years Jupiter 12 years Saturn 30 years Uranus 84 years Neptune 165 years Pluto 248 years

UNIT: OUTER SPACE

Step V. Lesson Plans

Sub-Unit: The Moon - Grade 3

READING: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Develop an appreciation for the moon through children's literature.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Read books pertaining to the moon.	1.1 Select numerous books and articles about the moon and display them about the room. Have children read books and articles or read them orally to the class.	1.1 Numerous books about the moon.	1.1 A good teacher "read-aloud" book": ON THE MOON, by Jenny Vaughan.
	1.2 Children may bring books and articles from home to share with the class.	1.2 Display area for books and bulletin board space for clippings.	
	1.3 Develop a bulletin board to record reading progress using a spaceship ladder with the caption, "Let's Shoot for the Moon."	1.3 Bulletin board.	

READING: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Create an understanding of moon vocabulary.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Identify vocabulary words.	1.1 Use flashcards with moon vocabulary words for children to read and discuss.	1.1 Flashcards with moon vocabulary words. Refer to vocab. list.	1.1 These words could be used as "bonus" spelling words.
	1.2 Review the meaning of a synonym.	1.2 Blackboard, chalk.	
	1.3 List synonyms for moon vocabulary words; i.e. satellite, moon, Sputnik).		

LANGUAGE ARTS: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Develop business writing skills for a specific purpose.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Apply the rules for writing a business letter for a specific purpose.	1.1 Have students meet in small groups assigned to write a business letter to an astronaut, requesting information about his trip to the moon.		1.1 To begin this lesson, take the class to the local post office to see how mail is processed; how zip codes work; how postage is figured. At the same time, reserve bulletin board space for a stamp collection. Have students watch their daily mail and remove stamps. They can mount the stamps on the board. This will allow the students to be aware of common stamps and also the extensive variety of stamps.
	1.2 Discuss the following phrases and their importance to the assignment: who, what, when, where, why.		
	1.3 On the overhead have a transparency of a business letter with several mistakes in letter form and punctuation. Solicit suggestions from class to the corrections.	1.3 Overhead, transparency of a business letter with mistakes in form and punctuation.	1.3 BUSINESS LETTERS: a. Heading - Address, city, state, date. b. Inside Address - Your return address. c. Greeting - "Dear ____." d. Body - Main art of letter. e. Closing - Salutary comments. f. Signature - Your name.

LANGUAGE ARTS: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Develop business writing skills for a specific purpose (continued).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
2. Write a business letter to request specific information.	2.1 Distribute cards with names and addresses of specific astronauts to each group.	2.1 Cards with names and addresses (not the zip code) of the astronauts.	2.1 Consult NASA or WORLD ALMANAC AND BOOK OF FACTS for this information.
	2.2 Instruct each group to write a business letter to the astronaut requesting information about his trip to the moon. Remind them to use correct letter form.	2.2 Stationary.	2.2 A sample business letter displayed on an experience chart would be helpful. Students will be designing "moon" stationary as an art project. This might be a good opportunity to make photocopes of their stationary for use in writing these letters. Also refer to Art, Section on designing a stamp.
	2.3 Edit and correct the letters.		
3. Address an envelope in the correct form.	3.1 Instruct each group to address their envelopes, using correct form.	3.1 Envelopes.	
4. Locate appropriate zip codes for addresses.	4.1 Using the zip code directory, locate the appropriate zip code and record on envelope.	4.1 Zip Code Directory.	

LANGUAGE ARTS: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Generate creative story writing.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Locate and define vocabulary words appropriate for various writing exercises through the use of a thesaurus and brainstorming exercises.	1.1 On an experience chart write the following headings on each chart page: a) describing words; b) action words; c) things; d) persons; e) places.	1.1 Experience chart, pen.	
	1.2 Initiate a brainstorming session centered around the theme of the moon. Record words on appropriate page on the experience chart.		
	1.3 Select one word from one column and one from another column and ask: "How is a ___ like a ___?" Example: "How is an astronaut like a crater?" Continue procedure, recording pairs on the chalkboard.	1.3 Blackboard, chalk.	
	1.4 Have students select one of the pairs on the board or one of their own choosing, and write a story using the comparison phrase.		1.4 Students might enjoy making groups of items from three different categories; i.e., "An orbit and a crater are barren..."
	1.5 Have students illustrate their stories and share with others.	1.5 Drawing paper, crayons, markers.	
2. Write creative stories using independent story starters.	2.1 Distribute task cards with specific story starters printed on them.	2.1 Story starter task cards.	
	2.2 Give each child a moon shaped paper. Their task is to describe their adventure as a visitor to the moon.	2.2 Moon shaped writing paper.	2.2 Remind students to use the "5 W's" in their adventure. Discuss THE WIZARD OF OZ, and Dorothy's adventure "over the rainbow."

LANGUAGE ARTS: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Generate creative story writing (continued).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
3. Write creative stories from an assigned topic.	3.1 Read a letter from the president of the United States to the class. (Letter is created by teacher). This letter congratulates them on their official assignment to accompany the next space mission to the moon.	3.1 Letter from the president in official looking envelope and letter head, which was actually written by the teacher.	
	3.2 Divide class into two groups, one to list why they would like to go and the other why they wouldn't.		
	3.3 Record reasons and bring groups back to share.	3.3 Writing paper.	
	3.4 Have students write a diary with entrys about their trip to the moon.	3.4 Writing paper.	3.4 Talk about THE WIZARD OF OZ and Dorothy's trip "over the rainbow" to the Land of Oz.
	3.5 Generate a class discussion on a time capsule.		
	3.6 Have children create a story on what five items they would put in a time capsule to be placed on the moon.	3.6 Writing paper.	
	3.7 Illustrate the moon capsule stories. Make a class book to include all the stories.	3.7 Drawing paper, crayons, markers.	
	3.8 Have children write a story about the "man in the moon." Illustrate stories.	3.8 Writing paper, drawing paper, crayons, markers.	
4. Write creative stories in newspaper format.	4.1 Discuss the qualities of a good newspaper story. Study front page of various newspapers.	4.1 Newspapers.	4.1 Have a newspaper reporter come and speak to the class.
	4.2 Have each student write their own front page newspaper article on their trip to the moon. Illustrate.	4.2 Writing paper, drawing paper, crayons, markers.	4.2 Be sure to: a) Give your paper a name; b) Write a good headline; c) Draw a picture for your headline; d) Write the story.

LANGUAGE ARTS: The Moon - Grade 3

ASSIGN. SCOPE OF LESSON STATEMENT Create science fiction stories.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Write a science fiction story after listening to examples and discussing the features of this form of literature.	1.1 Select and read to the class a science fiction story.	1.1 Book - science fiction selection.	1.1 Isaac Asimov and Jules Verne are good authors.
	1.2 Discuss the elements of a science fiction story. Record on experience fiction story. Record on an experience chart.	1.2 Experience chart.	1.2 Science Fiction Story Elements 1) Real characters; 2) Fairy-tale-type creatures; 3) Suspense; 4) Mystery; 5) Space is often the location; 6) Future.
	1.3 Encourage students to write their own science fiction stories with the theme, "The Moon - A New Frontier." Illustrate stories.	1.3 Writing paper, drawing paper, crayons, markers.	
	1.4 Have students make a paper bag puppet depicting the main character.	1.4 Paper bags, scrap materials.	
	1.5 Share stories, using puppet to introduce the story.		1.5 Stories could be shared with other classrooms.

LANGUAGE ARTS: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Develop poetry writing skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Learn about the many poetic forms.	1.1 Generate a class discussion on the many poetic forms.		1.1 Common Poetic Forms: a) Free Verse; b) Couplet; c) Quatrain; d) Haiku; e) Tanka; f) Senryu; g) Cinquain.
	1.2 Have students recite examples.		1.2 Use "Hey Diddle Diddle" in keeping with unit theme.
	1.3 Discuss meter.		1.3 If discussing meter, this would be a good time to introduce number prefixes. monometer pentameter dimeter hexameter trimeter heptameter tetrameter octameter (The number of feet in a line sets its meter).
2. Write poetry from an assigned topic.	2.1 Have each student pretend he is on board a spaceship headed for the moon.		
	2.2 Make up some poems about his thrilling time using several poetic forms.		
	2.3 Record poems on rocket shaped writing paper.	2.3 Rocket shaped writing paper.	
	2.4 Display on bulletin board or as mobiles.	2.4 Bulletin board or a fish wire and hooks.	

LANGUAGE ARTS: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Create a short play.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Provide specific beginning and ending script lines for development of a short play.	1.1 Generate a class discussion on plays. Be sure to emphasize WHO characters are, WHAT characters are doing in each scene, and WHERE the action takes place.		
	1.2 Divide class into four groups. Assign each group a first and last line of dialogue. Ex. "Look at that giant crater," and "That's the end of the ugly green monster."	1.2 Four sets of first and last line dialogue cards.	
	1.3 Each group will write a short skit which starts with the assigned first line and ends with the assigned last line.		
2. Act out short plays.	2.1 Short plays are performed for the class.		2.1 Perform these plays on a different day than they were written so children will have opportunity to bring in props.
	2.2 Tape record plays if so desired.	2.2 Tape recorder.	

MATH: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Create an understanding of geometric shapes.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Develop a vocabulary list of words that relate to geometry.	1.1 Have students meet in small groups to find two lists of words. a) List one - Words that describe geometric figures and shapes found on the moon. b) List two - Words that do not describe geometric shapes on the moon.	1.1 Paper, pen.	1.1 Sphere, circle, semi-circle, radius, crescent, line, are all words easily recalled when discussing the moon.
	1.2 As a large group have a representative from each small group put their list of words on the blackboard to form a common list of words.	1.2 Blackboard, chalk.	
2. Define each word from the above class list: geometry related words.	2.1 Each student will write a definition for all the words on the list.	2.1 Writing paper.	
	2.2 Review the definitons as a class discussion to determine acceptable definitions.		
	2.3 Make a class dictionary.		
3. Design "moon" creations using geometric figures and shapes.	3.1 Draw an imaginary "man on the moon" using geometric shapes found on the moon.	3.1 Drawing paper, crayons and markers, ruler, compass, protractor.	
	3.2 Create a moon robot using geometric shapes found on the moon.	3.2 Drawing paper, crayons, markers, ruler, compass, protractor.	3.2 These could be created using scrap and recycled items. (Toilet paper tubes, boxes of various sizes, coils, etc.). Glue and paint.
	3.3 Create a moon creature using geometric shapes found on the moon.	3.3 Drawing paper, crayons and markers, ruler, compass, protractor.	3.3 These could be created using scrap and recycled items. (Toilet paper tubes, boxes of various sizes, coils, etc.). Glue and paint.

MATH: The Moon - Grade 3

ASSIGN. SCOPE OF LESSON STATEMENT Practice basic facts in verbal math problems.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create verbal math problems for addition using imaginary life forms on the moon as a theme.	1.1 The student will create four verbal math problems using addition as the basic fact. The sum must be four digit numbers. The context of the problems will refer to an imaginary life form on the moon.	1.1 Paper, pencil.	1.1 Example - The Lunar Sonny Moonball Team discovered three craters full of moonballs. The first crater had 260 balls, the second 408 balls, and the third 1322 balls. How many balls did the Lunar Sonny Team discover? The teacher will need to guide the children carefully at first. They will need to be given specific parameters; i.e., a simple addition problem, one step, and expand to more difficult problems.
	1.2 Draw and color an illustration for one or more of your verbal math problems.	1.2 Drawing paper, crayons, markers.	

MATH: The Moon - Grade 3

ASSIGN. SCOPE OF LESSON STATEMENT Provide practice in measurement skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Measure various objects, (linear).	1.1 Discuss the classroom as the imaginary size of a launching pad. Measure the length and width of the classroom using yardsticks, children's feet, etc. Record results.	1.1 Measuring tools.	1.1 Develop concept of why we use different units of measure for different purposes. (We don't measure distance between Earth and Moon in yards).
	1.2 Weigh several apples and find the average. Compare the weight of a real apple to that of a dehydrated apple that would be taken on a spacecraft.	1.2 Three of four apples. Dried or dehydrated apples. Scale.	1.2 Review how to find an average.

MATH: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of a graph.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Construct a bar graph.	1.1 Review bar graphs and give an example on the board.	1.1 Blackboard, chalk.	
	1.2 Make a bar graph comparing ages of the astronauts.	1.2 Graph paper.	1.2 Teacher will need to check with NASA for ages of astronauts. THE WORLD ALMANAC AND BOOK OF FACTS will give dates regarding astronauts.
2. Construct a pie graph.	2.1 Review pie graphs and give an example.		
	2.2 Make a pie graph to determine amount of money (%) government spent on space exploration as compared to other programs for a given year.		2.2 This might be a good opportunity to introduce elementary principles of economics.

MATH: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of money.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Recognize money value.	1.1 Review value of money.		
	1.2 Use real or play money to practice recognizing, counting and exchanging for equal values.		
2. Compute costs and make change.	2.1 Generate a class discussion on how a cashier knows what to charge for your purchases (with or without a calculator).		
	2.2 Set up a moon outfitter's shop.	2.2 Items to put in a moon outfitter's shop.	
	2.3 Let students take turns computing costs and making change.	2.3 Play (or real) money and cash register.	2.3 This would be a good opportunity to provide practice using a caluclator. A local business machine shop may have a used cash register to loan out.

SCIENCE: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Observe the shape of the moon.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Observe and record the shape of the moon.	1.1 Generate a class discussion and how and why the moon seems to change its shape as it travels around the earth.		
	1.2 Pass out blank calendar sheets.	1.2 Calendar sheets (blank).	
	1.3 Have students fill in month, days of the week and numbers for the month.	1.3 Pencils.	
	1.4 Have students draw the shape of the moon for a designated amount of weeks.		
	1.5 At the of observation share calendars with the class.		1.5 It might be nice to post the calendars on a bulletin board.

SCIENCE: The Moon - Grade 3

ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of special supplies and equipment astronauts need on a moon trip.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Learn about the supplies and equipment an astronaut uses on a trip to the moon.	1.1 Generate a class discussion on the kinds of supplies people take when they go on a trip as compared to the kinds of supplies astronauts take when taking a trip to the moon.		
	1.2 Display pictures on a bulletin board depicting the supplies an astronaut uses; i.e., special suit, air tank, land rover.	1.2 Pictures, bulletin board.	
	1.3 Discuss foods that are now available at the supermarket but were originally developed for spaceflights. These include freeze dried instant and powdered foods. Have some of these foods available for your students to try.	1.3 Samples of foods that could be used on a spaceflight.	1.3 Sidelight - Discuss "cheese" on the moon. Extension Activity - Some students may wish to write to NASA to find out how food storage and preparation has changed since the early spaceflights of the 1960's.
	1.4 Discuss and demonstrate the fact that astronauts need special clothing for working on the moon.		1.4 Clothing must keep them warm when they are on the dark side of the moon, and cool when they are in the sun.
	1.5 Let students design their own spacesuit.	1.5 Drawing paper, pencil, crayons.	
	1.6 Compare and contrast the type of space vehicles that have been used by astronauts to travel in space in a class discussion.		1.6 Be sure to include the early rockets and capsules that the Mercury astronauts used, the Saturn V rocket, the lunar rovers of the Apollo astronauts, and the space shuttles that are being used now.
	1.7 Have students research and report on the hazards of space exploration.		1.7 Example: hazards of radiation, lack of air pressure.

SCIENCE: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of the moon as the Earth's satellite.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Identify objects as satellites.	1.1 Write the words "satellite" and "orbit" on the board. Discuss their meanings.	1.1 Chalkboard, chalk.	
	1.2 Have one student stand in front of the class. Have a second student hold a basketball and walk around the first student. Relate that the basketball is a satellite.	1.2 Basketball.	1.2 A hula hoop may be used to demonstrate the term "revolving."
	1.3 Go through same explanation. Have first person represent earth and basketball represent the moon.	1.3 Basketball.	
	1.4 Excellent photographs of some of Jupiter's moons were sent back by Voyager space probes. Display copies of these and have students write a comparison of Earth's moon with Jupiter's moon.	1.4 Pictures.	
	1.5 Divide class into five groups. Have each group do research and then present a panel discussion on their findings. a) weather satellites; b) communication satellites; c) satellites use for navigation; d) scientific satellites; e) military satellites.		1.5 Artificial Satellites - a) weather - help scientists forcast weather and study how weather is made. b) communication satellites - make it possible to send radio messages, telephone calls, and television programs to different parts of the world.; d) scientific satellites - study many aspects of outerspace; e) military satellites - help one nation monitor the activities of another nation that poses a possible threat.
	1.6 Write about and design an artificial satellite you would like to put in space.	1.6 Paper, pencils, crayons.	

SCIENCE: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT To discover how craters are made.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Hypothesize and demonstrate how craters are formed on the moon.	1.1 Smooth out the surface of a soft, sandy area.	1.1 Rocks of various sizes and shapes, sandy area.	
	1.2 Have students, one at a time, throw a large rock nearly straight down to form an impact crater. Carefully remove the rock.		1.2 Safety precaution - Make sure students are not close enough to have any sand fly up in their faces. Goggles may be worn. Remind students to use care when throwing the rocks. You may find it helpful to rake the sandy area between sessions.
	1.3 Have students identify the changes which took place.		
	1.4 Generate a class discussion about moon craters. a) How were they made? b) How can you make several craters from one impacting object? c) How is the rock like a meteorite?		
	1.5 Have students write a paragraph on how craters are formed.		1.5 A good research project for advanced and/or interested students would be to discover why the earth is not covered with many craters.

SCIENCE: The Moon - Grade 3

ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding on how scientists learn about the moon.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Communicate about the various ways in which we learn about the moon.	1.1 Have pictures and books about space exploration available for class to read.	1.1 Books and pictures about the moon.	
	1.2 Generate a class discussion on ways to learn about the moon. a) telescope; b) unmanned spacecraft; c) manned spacecraft; d) pictures of moon; e) astronauts - tests.		
	1.3 Bring a telescope to class. Observe and record observations.	1.3 Telescope.	
	1.4 Have students pretend they are astronauts. Write about what kinds of tests they would do on the moon.	1.4 Writing paper, pens.	1.4 Extension - Some students may be interested in finding out how scientists and engineers track spacecraft as they travel to the moon.

SOCIAL STUDIES: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Develop map and globe skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Draw and label a map of the sun, moon and planets.	1.1 Discuss the various kinds of maps.	1.1 Wide selection of maps; a terrestrial and celestial globe.	1.1 There are two types of maps, and special or thematic maps. A globe is a general reference map mounted on a ball called a globe. There are two kinds of globes. A terrestrial globe shows continents and other features of the earth. A celestial globe shows the stars and planets.
	1.2 Have the students draw and label a map of the sun, moon and planets. Be sure to emphasize the importance of scale.	1.2 Drawing paper, compass, ruler, colored pencils.	1.2 If large styrofoam balls are available, have students make a celestial globe.

SOCIAL STUDIES: The Moon - Grade 3

ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of a time line.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Make a time line depicting space exploration.	1.1 Discuss what a time line is.		
	1.2 Have students make a time line of significant events in their lives including current year. Display on a bulletin board. Children might bring in photos for added interest.	1.2 Paper, bulletin board.	1.2 It might be good to solicit parents' help through use of child's baby book and photo albums to recall significant dates and happenings.
	1.3 Have students make a time line that shows the significant events related to outerspace exploration. Display.	1.3 Paper.	

SOCIAL STUDIES: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of communication for public awareness.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create commercials.	1.1 Discuss ways to communicate a message to public. etc.		1.1 Television, radio, newspaper, billboards, direct sales approach,
	1.2 Take a field trip to a local radio or television studio.		
	1.3 Have students write a radio commercial advertising space trips to the moon.		1.3 Have students write and dramatize a commercial for TV advertising space trips to the moon. Use a video recorder, if available.
	1.4 Record commercials on tape recorder.	1.4 Tape recorder.	
	1.5 Have students create a travel brochure on a space trip to the moon.	1.5 Drawing paper, colored pencils, sample travel brochures.	1.5 A visit to a travel agency would be nice.

SOCIAL STUDIES: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Learn about "world travel" for a purpose.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Learn about people, places and events in a foreign country through investigation of their space program.	1.1 Generate a class discussion on what it would be like to travel in a foreign country.		
	1.2 Divide the class into four groups. Each group is to select a different country to "explore." They pretend they are scientists touring the country and also learning about their space program.		
2. Develop specific activities related to their assigned country.	2.1 Call a travel agency and request travel brochures for their specific country.		2.1 Review telephone manners.
	2.2 Find particulars about the country to which they are traveling (population, elevation, geography, climate, culture, customs, tourist attractions). Record in report form.		2.2 World almanac, encyclopedias, are good reference books.
	2.3 Develop a travel itinerary with the information they have fund.		2.3 Locate someone who has visited these countries that would come into your classroom and present a travelogue.
	2.4 Locate name of head person in each country and name of person in charge of space program. Record.		
	2.5 Write a list of questions the tour group would like to ask the person in charge of the space program.		
	2.6 Ask each student to write a formal paper which describes their trip in detail after they retern, describing the experiences they have undergone.		
	2.7 Have each group present a panel discussion on their country. Open it up for class questions.		

ART: The Moon - Grade 3

ASSIGN. SCOPE OF LESSON STATEMENT Provide experience making lunar footprints.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Make a lunar footprint.	1.1 Generate a class discussion on how it would feel to make a lunar footprint. Show photograph of lunar footprint.	1.1 Picture of lunar footprint.	
	1.2 Make lunar footprints. a) Cover floor with newspaper. b) Place dishpan with 10-15 centimeters of sand in center of newspaper. c) Add just enough water to wet the sand and mix with spoon. d) Step in the dishpan with your bare foot and stand. e) Step out, being careful not to damage footprint. f) Set dishpan in safe place and look for changes in three days.	1.2 Newspaper, large dishpans, sand, bucket of water, large spoons.	1.2 You should make arrangements a few days before this activity to obtain and store enough sand. Have students bring in newspaper and dishpans several days before activity. This activity may be done on the school yard to facilitate clean-up. You may want to save the used sand to make plaster of paris sandcasts in a later art lesson.

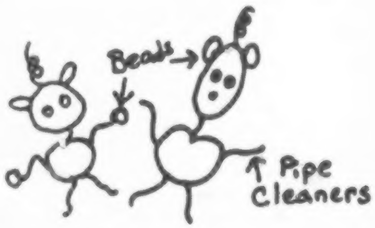
ART: The Moon - Grade 3

ASSIGN. SCOPE OF LESSON STATEMENT Provide opportunity for artistic expression.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Develop individual artistic expression through specific art projects.	1.1 Have students design a postage stamp with "moon exploration" as the theme.	1.1 Drawing paper, colored pencils, crayons, markers.	
	1.2 Have students design stationary using sketches of moon's surface.	1.2 Drawing paper, colored pencils, crayons, markers.	
	1.3 Have students design a moon flag.	1.3 Drawing paper, colored pencils, crayons, markers.	
	1.4 Have students create a diorama of the first American flag placed on the moon.	1.4 Drawing paper, colored pencils, crayons, markers, shoe boxes or cardboard boxes.	1.4 Display flags of different countries.

ART: The Moon - Grade 3

ASSIGN. SCOPE OF LESSON STATEMENT Develop imagination through creation of imaginary moon creatures.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create imaginary moon creatures using different mediums.	1.1 The students will construct moon creatures from recycled objects.	1.1 Recycled items: toilet paper rolls, egg cartons, packing styrofoam, etc.	
	1.2 The students will construct moon creatures using clay.	1.2 Clay, embossing objects such as nails, buttons, screen, paint, silicon spray.	
	1.3 The students will construct moon creatures using egg cartons.	1.3 Egg cartons, glue, scissors, paint, brushes.	
	1.4 The students will construct "Little Green Men from the Moon."	1.4 Green pipe cleaners, green tempera paint, granulated detergent, old beads or jewels, 1" diameter styrofoam dowel, 1 1/2" diameter styrofoam balls, strong glue.	 1.4 Slice styrofoam dowel into pieces 3/8" for heads. If styrofoam bodies are used, make them from 1 1/2" balls cut in half. Mix a little granulated detergent with green tempera to paint heads and bodies. Let dry. Glue on bead or jewel face features. Ears will be more permanent if a straight pin is used to attach the beads. Fashion arms, legs, and spiraled antenna from green pipe cleaners. Attach.

MUSIC: The Moon - Grade 3

ASSIGN. SCOPE OF LESSON STATEMENT Develop listening skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Listen to songs and recordings about the moon.	1.1 Have the children listen to recordings about the moon.		1.1 MOON RIVER; SOMEWHERE OVER THE RAINBOW.
	1.2 Ask children some questions from recordings listened to.		1.2 Good comprehension activity.

MUSIC: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Develop imagination through musical experience.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create words for music melodies.	1.1 Have children write "moon" lyrics to familiar tunes. Illustrate song (drawing).	1.1 Paper, pencil, crayons.	
	1.2 Tape record the original songs that are created by the children.	1.2 Tape recorder, pianist.	
	1.3 Write original verse about life aboard a spaceship.	1.3 Paper, pencil.	1.3 Listen to and sing the song: "This is the way we wash our clothes...so early Monday morning." This can be applied to life and activities aboard a spaceship.
2. Create a sound effects tape.	2.1 Discuss and listen to various sound effects tapes.	2.1 Sample sound effects tapes.	
	2.2 Divide class into four groups.		
	2.3 Give each group a specific task card for an event in an outer space movie.	2.3 Task cards.	
	2.4 Have each group make a sound effects tape for their task card. Share with class.	2.4 Sound effect recordings, classical and other types of musical recordings.	2.4 Students could illustrate their task card assignment.

MUSIC: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Experience fun/play with musical soundmakers.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Play a space game using castanets, finger cymbals or other soundmakers.	1.1 The class pretends to be in a space station laboratory, preparing to monitor the blast-off of a manned space rocket to the moon.	1.1 Assign a space leader and give him a bell to ring. Item to be used as cobalt.	
	1.2 When space leader rings the bell, he informs the group that radioactive cobalt is missing somewhere in the lab. It must be found before the astronauts can take off. The Interstellar Space Commission must use the special "cobalt gun" to locate the missing substance.	1.2 Toy gun/guns to use as "cobalt" finder.	1.2 Good opporunity to discuss the terms radioactive and cobalt.
	1.3 Space leader chooses one (or more) students to leave room with cobalt gun. While the class watches the space leader hides object predetermined as cobalt.	1.3 Cobalt object.	
	1.4 Each student rings a specific noisemaker to indicate "hot or "cold."	1.4 Noisemakers (2 varieties).	1.4 Good time to use such noisemakers as castanets and finger symbols.
	1.5 Student/students return to find object, while students make noise to aid in discovery of cobalt.		
	1.6 Game continues. New leaders are chosen.		

HEALTH AND PHYSICAL EDUCATION: The Moon - Grade 3

ASSIGN. SCOPE OF LESSON STATEMENT Develop an awareness of health hazards and needs related to outer space travel.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Verbalize the basic principles of safe travel in outer space.	1.1 Initiate a discussion of the possible health hazards related to a trip to the moon.		
	1.2 Invite a pilot to come to speak to the class about safety in the air.	1.2 Guest speaker.	
	1.3 Divide class into groups to generate a list of air safety rules. Record on experience chart.	1.3 Experience chart.	
	1.4 Make a class book of information gleaned from class discussion and pilot visitor.	1.4 Writing paper.	
2. Develop an appreciation for specific food needs in outerspace.	2.1 Bring in dried foods for tasting.		

HEALTH AND PHYSICAL EDUCATION: The Moon - Grade 3
ASSIGN. SCOPE OF LESSON STATEMENT Provide opportunity for pantomiming.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. **Develop creative expression and imagination through free-flowing pantomimes.**	1.1 Have class discussion on the feelings associated with space travel to the moon.		
	1.2 Teacher explains that the class will be taking a fantasy trip to the moon. Children will pantomime what teacher announces.		
	1.3 Children get into large circle.	1.3 Large area (gym).	
	1.4 Teacher announces what children are to pantomime: "You will slowly become an astronaut; you are stepping into your spaceship getting ready for blastoff; you are floating onto the moon's surface in slow-motion."		1.4 Many more moon activities can be pantomimed to develop motor skills. The children's poem, "Hey Diddle Diddle," would be a great "exercise" to pantomime.

UNIT: OUTER SPACE

Step V. Lesson Plans

Sub-Unit: Galaxies - Grade 4

READING/LANGUAGE ARTS: Galaxies - Grade 4

ASSIGN. SCOPE OF LESSON STATEMENT Develop knowledge of research skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Discuss with the class the function of the table of contents.	1.1 Formulate an activity center that utilizes a table of contents from many books. Have worksheets for each book that asks specific questions. Answers will come directly from the table of contents from each book.	1.1 Books with full detailed table of contents.	
2. Discuss with the class the function of an index.	2.1 Formulate an activity center that utilizes an index from many books. Have worksheets for each book that asks specific questions. Answers will come directly from index from each book.	2.1 Books with full detailed index.	

READING/LANGUAGE ARTS: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Develop a vocabulary list.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Develop a vocabulary chart.	1.1 As new words are introduced continue to build onto the vocabulary chart.	1.1 Chart paper, marker.	1.1 Examples of vocabulary: galaxy, galactic, nebulea, light year, interstellar matter, star, milky way, stellar, nucleus, elliptical, spiral, globular cluster.

READING/LANGUAGE ARTS: Galaxies - Grade 4

ASSIGN. SCOPE OF LESSON STATEMENT Read and report factual information for enjoyment.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Read various books.	1.1 Visit library to select books on outer space. 1.2 Children select and read various books. 1.3 Children share ideas from their stories with other classmates in group setting.	1.1 Local or school library.	

READING/LANGUAGE ARTS: Galaxies - Grade 4

ASSIGN. SCOPE OF LESSON STATEMENT Create word searches and crossword puzzles.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Prepare a word search (children/teachers).	1.1 Use vocabulary chart words for the word search.	1.1 Abundant word sources on the topic.	
2. Develop crossword puzzles.	2.1 Use vocabulary chart words in developing the puzzles.	2.1 Abundant word sources on the topic.	2.1 Some computer software is available for creating crossword puzzles.

MATH: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of proportions in space.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create a classroom size diorama that depicts the Milky Way Galaxy.	1.1 The whole class will research the sizes of various planets and stars.	1.1 Encyclopedias, charts, maps, science texts and all other materials related to space. Also any objects that are suitable for depicting the planets, sun and moon.	1.1 Agree on a standard measure to use while studying this topic; i.e., 1mm will be the same as a light year.
	1.2 Research the distances they are apart.		
	1.3 Introduce the concept of proportions (2x, 3x, 4x, etc.).		
	1.4 Find and measure various objects to decide which they will use.		
	1.5 The class will set up a galaxy in the classroom. Proportionally accurate to that in space.		

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MATH: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of light year.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Discuss the unit of a light year.	1.1 The whole class will discuss the concepts involved with the light year measurement.	1.1 Resource materials including photographs.	1.1 Suggested facts to be included: 1. The distance to the sun is 93 million miles. 2. The distance to our nearest star alpha-centauri, is 25,000,000,000,000 miles, or 25 million million miles. 3. Distant stars are inconceivably more remote. 4. One light year is the distance that a beam of light travels in one year. 5. The distance covered by a beam of light in one second is 186,000 miles. 6. The diameter of our galaxy is about 100,000 light years; its maximum thickness is 15,000 light years. 7. An average distance between galaxies would be approximately a million light years.

MATH: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of irregular and regular shapes.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Identify regular and irregular shapes.	1.1 Define regular and irregular shapes by utilizing actual drawings. 1.2 Label certain geometric shapes, triangle, square, pentagon, etc. 1.3 Categorize shapes from 1.2 as regular or irregular.		

MATH: Galaxies - Grade 4

ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of irregular shaped galaxies, spiral galaxies and elliptical galaxies.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Identify an irregular galaxy, spiral galaxies and elliptical galaxies.	1.1 In a learning center allow children to visually compare the 3 different shapes of galaxies. Display illustrations and photographs.	1.1 Provide materials with pictures and photographs.	1.1 Suggested facts: a) Irregular - These have no simple geometric form or clear design. b) Elliptical - These galaxies take on the shapes of more or less flattened disks. About 25% of all galaxies are in this group. c) Spirals - Our own galaxy is a spiral galaxy. These galaxies have spiral like arms extending 1500 light years wide. Its height is only 500 light years.

SCIENCE: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of galaxies.

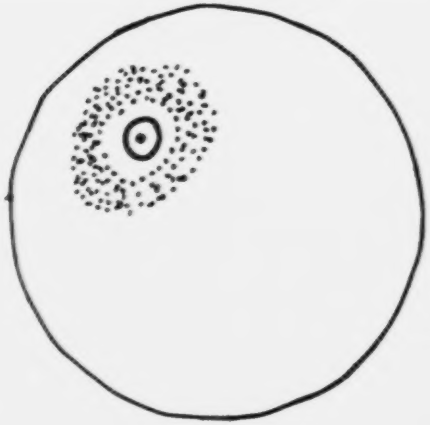
OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Discuss the facts involved with the topic of galaxies.	1.1 Class discussion.	1.1 Resource materials.	1.1 Suggested facts to be covered: 1. A galaxy is a large collection of stars, dust, and gas all held together in a group by the pull of gravity. 2. The sun and the solar system are part of a galaxy called the Milky Way. 3. Part of the galaxy, called the Milky Way, can be seen each night. 4. There are millions of stars in the Milky Way, and their light makes a milky band in the sky. 5. The galaxy has billions of stars in it and it has a shape that is somewhat like a flattened, circular wheel. 6. The whole galaxy is rotating around its center at a tremendous speed. 7. A nebula is a great cloud of dust in a galaxy. 8. Some nebula are easily seen because they reflect the light of nearby stars. 9. There are more than a billion galaxies beyond the galaxy.

SCIENCE: Galaxies - Grade 4

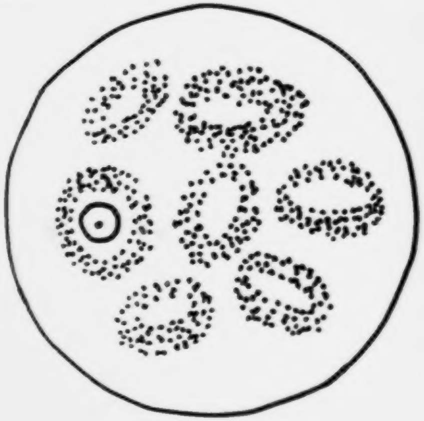
ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of galaxies (continued).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
			10. Galaxies are usually found in three shapes: irregular, spiral, and elliptical. 11. Irregular galaxies have many blue-white giant stars in them and are probably young galaxies. 12. Spiral galaxies have a number of spiral arms extending from their centers. 13. Elliptical galaxies are shaped like an oval or ellipse and are small than spiral galaxies. * Resource - SCIENCE FOR THE ELEMENTARY SCHOOL, Victor, Edward, 4th Edition.

SCIENCE: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Illustrate and communicate the size of our galaxy.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Prepare visual aids to depict the size of our galaxy.	1.1 Whole class activity draws a circle to represent the circumference of the universe. Our galaxy will be indicated inside the oval. The dot and the circle represent the sun and the solar system respectively. (See experience chart for illustration).		

SCIENCE: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Illustrate and communicate the size of other galaxies.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Prepare visual aids to depict the size of other galaxies in the universe.	1.1 The whole class will participate in drawing a representation of the 'complete' universe. Draw a circle to represent the universe. Include many other galaxies but explain that there are billions of galaxies that consist of billions of stars. Explain that our galaxy called the Milky Way contains the sun. (See experience chart.)		1.1 

SCIENCE: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of stars.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Identify what stars are.	1.1 Introduce the concept of stars with a class discussion.	1.1 Resource books and photos.	1.1 Include basic ideas: a) Stars are made up of hot gases that give off light. b) Stars twinkle because moving air causes light from the stars to move back and forth. c) Stars seem to move around the earth because the earth is turning.
	1.2 Give the students names of specific stars and planets. They are to organize these into a list. Stars in one column and planets in another.		
2. Demonstrate why stars twinkle.	2.1 Have someone hold the paper about 1 meter away from you with the heating element in front of the paper also 1 meter away. Have someone shine the flashlight through the handlens onto the paper. Because the air is moving over the heat source the light on the paper appears to move too.	2.1 Flashlight, dark paper, hand lens, source of heat (radiator or hotplate).	2.1 Another way that the pupils may demonstrate that light moves in air, is to have a fan blow across the beam of light that is aimed at the paper.

SCIENCE: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of stars (continued).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
3. Demonstrate why stars have different colors.	3.1 Hold a wire over a flame with a pair of pliers. As the wire becomes hot, the pupils will see it glow red, then orange, then yellow.	3.1 Wire, flame, pliers.	
4. Demonstrate why most stars are seen only at night.	4.1 Place a flashlight on a table near an electric outlet. The flashlight may be thought of as a star. Make sure the room is dark. Then shine the "star" on the wall. 4.2 Put a lamp on the table. (The lamp may be thought of as the sun). Use an extension cord to plug the lamp into the outlet. Turn on the lamp. Look at the wall. Slowly Slowly move the "sun" away from the wall as far as you can. Watch the wall.	4.1 Table, flashlight, bright lamp, extension cord, dark room.	4.1 Repeat the experiment with bright lights on in the room. The light from the flashlight can't be seen. Questions to ask: 1. What happened to the light from the "star" as you moved the "sun"? 2. Why? 3. Why do you think most stars cannot be seen during the day? 4. How might you show that stars may not be seen at night over big cities?

SCIENCE: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of spectrum.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Demonstrate that white light is composed of many colors.	1.1 Allow sunlight to pass through a prism to obtain a spectrum. Place a piece of white cardboard so that the band of colors produced is on the cardboard. Observe the position of the prism and where the spectrum is located in relation to the position of the prism. Have students observe which color is refracted the most; the least; and the order of the colors.		1.1 The colors are called the "visible spectrum." The range of colors is from red to violet, with orange, yellow and blue in between. (See also ESS Optics for more information and activities). Take advantage of observing rainbows. Make a comparison between rainbow colors and prism colors.
	1.2 Place a second prism in between the first prism and the cardboard so that the colors of the spectrum are changed back to white light. Have students observe.		

SOCIAL STUDIES: Galaxies - Grade 4

ASSIGN. SCOPE OF LESSON STATEMENT Create an awareness of current events.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Collect and investigate current articles that deal with the space topic.	1.1 Each student will be asked to look for current events on the space topic.	1.1 Current articles found in magazines, newspapers, and information seen on TV.	1.1 These pictures can be cut out and used for discussions and writing stories.
2. Prepare a display area for the articles collected.	2.1 Have an area specifically set up for displaying current articles. Assign a new person each week to help keep the display current.		
3. Discuss topics of high interest with the whole class.	3.1 Allow children to present their current event to the class.		

SOCIAL STUDIES: Galaxies - Grade 4

ASSIGN. SCOPE OF LESSON STATEMENT Create and speculate on family life in space.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Stimulate a class discussion on what life would be like in space.	1.1 Brainstorm and write ideas on the board.		
2. Have individual children role play family life in outer space.	2.1 Have students agree to which family member they want to be. 2.2 Decide on where they are going in space and why. 2.3 Have them design the situation as they feel it would be to travel there in space. 2.4 After the role playing, question them, and allow others to contribute, regarding how they would feel in various roles.		

ART: Galaxies - Grade 4

ASSIGN. SCOPE OF LESSON STATEMENT Create art projects that relate to space.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create scale size planets for the room diorama.	1.1 Find and/or make various objects to depict each of the planets, the sun, and the moon.		1.1 Refer to: Math, p. 1, Objective 1.
2. Illustrate space stories.	2.1 Have children use space stories that they have written or stories that they have read by other authors. Allow them to illustrate with any means available.		

MUSIC: Galaxies - Grade 4

ASSIGN. SCOPE OF LESSON STATEMENT Listen to music that relates to the space theme.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Listen to music with space theme.	1.1 The class will listen to music while working on other space projects.	1.1 "Star Wars" record.	
	1.2 Heath: science records featuring Joan Collins.		

MUSIC: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Create original songs about space and galaxies.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Formulate songs with space theme.	1.1 The class will formulate words that deal with space and put them into a musical melody familiar to them.		

HEALTH AND PHYSICAL EDUCATION: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Create original games from old favorites using space terminology.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Categorize the solar system in a word and hand clap game.	1.1 Double hand clap, 2 knee taps, alternate finger snap once. Words are said on finger snap (one word per snap).		

HEALTH AND PHYSICAL EDUCATION: Galaxies - Grade 4
ASSIGN. SCOPE OF LESSON STATEMENT Develop a nutritious outer space diet.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. List all food products that may be eaten dry without prepartion.	1.1 Go through all basic food groups and prepare 3 balanced meals from these dry unprepared foods.	1.1 Write NASA for listings of space shuttle food supply.	1.1 A discussion and exploration of various foods will be necessary to distinguish between regular and dehydrated foods; i.e., Bread may be seen as a dehydrated food at first vs. apples, etc.

UNIT: OUTER SPACE

Step V. Lesson Plans

Sub-Unit: Comets - Grade 5

READING/LANGUAGE ARTS: Comet - Grade 5
ASSIGN. SCOPE OF LESSON STATEMENT Create an understanding of the material make up of comet, and coma and tail.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Define terms: comet, coma, tail.	1.1 Read articles on comets.	1.1 Science-Math Resource Center ASTRONOMY MADE SIMPLE, Degani, Meir H. 433.86, Do/10-12, 1976, pp. 192-196 NEW FRONTIERS IN ASTRONOMY, "Scientific American," "The Nature of Comets," Whipple, Fred L., 433.8, F/10-12, 1975, pp. 36-45. HIGHLIGHTS IN ASTRONOMY, Hoyle, Fred, 433.8, F/10-12, 1975, pp. 84-92.	
	1.2 Write definition for each term: a) What it is; b) Material make-up of each.	1.2 Paper, pencil.	
	1.3 Class chart for definition of each term.	1.3 Wall chart paper, marker.	
2. Outline material make-up of comet, coma, tail.	2.1 Review as class definitions and material make-up.	2.1 Reading and definitions from 1.1 and 1.2, above.	
	2.2 Write individual outline.	2.2 Paper, pencil, notes.	

READING/LANGUAGE ARTS: Comet - Grade 5
ASSIGN. SCOPE OF LESSON STATEMENT Research, identify and report on orbital pathways of comets.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Utilize note taking skills and discuss orbital pathways.	1.1 Review note taking skills.		
	1.2 Read articles on comets.	1.2 Science-Math Resource Center: ASTRONOMY MADE SIMPLE, Degani, Meir H., 433.86, Do/10-12, 1976, pp. 192-196. VISUAL MASTERS ON ASTRONOMY, Walch, J. Weston, 433.8, WW/1-6, 1973t. COMET KOHOUTEK 1973-1974, NASA Publication, 433.85, NASA/10-12, 1973. HIGHLIGHTS IN ASTRONOMY, "Scientific American," Hoyle, Fred, 433.8, F/10-12, 1975, pp. 84-92.	
	1.3 Takes notes as individual reads.	1.3 Paper, pencil.	
	1.4 Class discussion highlighting orbital pathways.	1.4 Notes.	
2. Diagram three orbital patterns.	2.1 Based on notes, discussion and reading will diagram pathways.	2.1 Paper, pencil, notes.	

READING/LANGUAGE ARTS: Comet - Grade 5

ASSIGN. SCOPE OF LESSON STATEMENT Create word searches using comet names and vocabulary words.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Design word search based on comet names and vocabulary words, for classmates.	1.1 Each student will choose 3 names of comets and 7 vocabulary words and make a word search for a classmate.	1.1 Notes. HIGHLIGHTS IN ASTRONOMY, Hoyle, Fred, "Scientific America," 433.8, F/10-12, 1975, pp. 84-92. COMET KOHOUTEK 1973-174, NASA Publication, 433.85, NASA/10-12, 1973. Paper, pencil.	1.1 Refer to: Reading/Language Arts, p. 1, Objective 2; p. 2, Objective 1.

MATH: Comet - Grade 5
ASSIGN. SCOPE OF LESSON STATEMENT 1. Demonstrate understanding of scale of miles.
2. Create a scale of miles.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Interpret a scale of miles on a map by measuring distances.	1.1 Use Montana state map and calculate various distances by using scale.	1.1 Montana Highway Road Map Montana Department of Highways Helena, MT 59601	
	1.2 Use road map of U.S. and calculate various distances.	1.2 Road map of U.S. (local gas stations).	
		1.3 Ruler or string, pencil.	
2. Create a scale of miles for comet tail to be used by classmate,	2.1 Review notes on comet readings.	2.1 Readings/notes done in Reading.	2.1 Refer to: Reading/Language Arts, p. 1-3.
	2.2 Determine measure for inches to miles.		
	2.3 Select particular comet photo and using scale, measure lenth of tail.	2.3 Ruler or string, pencil.	

MATH: Comet - Grade 5
ASSIGN. SCOPE OF LESSON STATEMENT 1. Create a time line for comet appearances.
2. Predict reappearance of a comet.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create a time line demonstrating comet appearances.	1.1 Read time line on cosmic events.	1.1 Science-Math Resource Center: COSMOS, Sagan, Carl, 433.86, RH, 1980, pp. 274-276.	
	1.2 Create time line showing comet appearances.	1.2 Paper, pencil.	
2. Calculate and predict return of 2 comets.	2.1 Based on reading in COSMOS and own time line will predict possible return time for 2 comets of student's choice.	2.1 Same as above.	

MATHEMATICS: Comet - Grade 5
ASSIGN. SCOPE OF LESSON STATEMENT 1. Demonstrate understanding of how comets are named
2. Demonstrate understanding of Roman numeral value.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. "Discover" and name five comets in a given year.	1.1 Will read and simulate discovery of five comets in given year.	1.1 Science-Math Resource Center: ASTRONOMY MADE SIMPLE, Degani, Meir, 433.86, Do/10-12, 1976, pp. 192-196.	1.1 Object to remember is to have at least 12-15 comets discovered in a given year so Roman numerals can be used.
	1.2 Will name 5 comets.	1.2 Paper, pencil.	
2. Chart as a class the naming of all comets dicovered in the given year.	2.1 Each student will name the 5 discovered comets.	2.1 Notes from 1.2.	
	2.2 Wall chart made of the discoveries.	2.2 Wall chart and china marker.	

SCIENCE: Comet - Grade 5
ASSIGN. SCOPE OF LESSON STATEMENT Differentiate between a comet, a meteoroid, a star, and a planet, and chart the same.

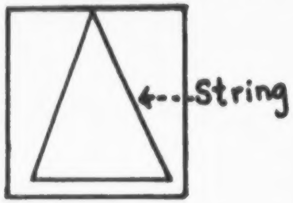
OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Distinguish characteristics of comet, meteroid, star, plant, and discuss the same, emphasizing similarities and differences.	1.1 Read to find definition of each term, taking notes for discussion.	1.1 Science-Math Resource Center: ASTRONOMY MADE SIMPLE, Degani, Meir, 433.86, Do/10-12, 1976, pp. 192-196.	
	1.2 Class discussion highlighting: similarities/differences.	1.2 Paper, pencil.	
2. Make a chart reflecting knowledge gained in Objective 1.	2.1 Each student constructs chart to reflect similarities and differences.	2.1 Notes fom 1.1. 2.2 Chart paper, pencil.	

SCIENCE: Comet - Grade 5
ASSIGN. SCOPE OF LESSON STATEMENT Will understand difference in terms: gravitational pull and radiational push of the sun.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Understand difference between terms, gravitational pull and radiational push and have basic understanding of why each occurs.	1.1 Read articles.	1.1 Science-Math Resource Center: ASTRONOMY MADE SIMPLE, Degani, Meir, 433.86, Do/10-12, 1976, pp. 192-197. HIGHLIGHTS IN ASTRONOMY, Hoyle, Fred, 433.8, F/10-12, 1975, pp. 84-92.	
	1.2 Discuss solid vs. gas in comet make-up.	1.2 Readings in 1.1.	1.2 Refer to: Reading/Language Arts, p. 1, Objective 1.
	1.3 Set up solids, liquids, gases demonstration.	1.3 Science-Math Resource Center: ESS Colored Solution; ESS: Gases & Airs.	
	1.4 Class discussion of "pull" of sun vs. "push" of the sun.		

SCIENCE: Comet - Grade 5

ASSIGN. SCOPE OF LESSON STATEMENT Recognize movement patterns of coma and tail.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Understand differences in movement patterns, and be able to discuss same in class.	1.1 Read article on movement patterns.	1.1 Science-Math Resource Center: HIGHLIGHTS IN ASTRONOMY, Hoyle, Fred, 433.8, F/10-12, 1976, pp. 192-196. ASTRONOMY MADE SIMPLE, Degani, Meir, 433.86, Do/10-12, 1976, pp. 192-196.	
	1.2 Class discussion: highlighting sun and Jupiter as forces effecting movement.		
	1.3 Create elliptical pathway.	1.3 1 piece cardboard, 3 push pins, loop of string.	1.3 Move string at any point and will make elliptical pathway. 
	1.4 Film: Ellipsis.	1.4 Physics Department, MSU.	
2. Write short paragraph reflecting knowledge of different movement patterns.	2.1 Review readings and class discussion.	2.1 Notes, articles.	
	2.2 Write individual paragraphs.	2.2 Paper, pencil.	

SOCIAL STUDIES: Comet - Grade 5

ASSIGN. SCOPE OF LESSON STATEMENT Will develop awareness of media accounts of comet sightings, and report on same.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Develop media reading and research skills.	1.1 Read local newspapers.	1.1 BOZEMAN DAILY CHRONICLE; BILLINGS GAZETTE; GREAT FALLS TRIBUNE; Any magazine that feature comet articles; OLD FARMER'S ALMANAC' Vol. #CXCIII, 1985, pp. 42-46.	
2. Summarize article(s) read.	2.1 Write summarizing paragraphs on article read.	2.1 Paper, pencil.	
3. Orally report article to class.	3.1 Using summary and article, will report to class.	3.1 Summary and article.	

SOCIAL STUDIES: Comet - Grade 5
ASSIGN. SCOPE OF LESSON STATEMENT Will develop understanding of historical signficance given to comet sightings.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Research and report on documented changes occurring in governments simultaneously with comet appearances.	1.1 Individual research to find changes in government heads, policies.	1.1 OLD FARMER'S ALMANAC, 1985, "Earth's Most Mysterious Visitor," Gropman, Donald, Mirvis, Kenneth, pp. 42-46. NATIONAL GEOGRAPHIC, Vol, 146, No. 2, August, 1974. "What You Didn't See In Kohoutek, "Weaver, Kenneth F., pp. 214-223. 1.2 Other articles. 1.3 Paper, pencil.	
2. Report to class on findings.	2.1 Organize notes, write report to give to class.	2.1 Paper, pencil.	

SOCIAL STUDIES: Comet - Grade 5
ASSIGN. SCOPE OF LESSON STATEMENT Will research and report to class on a comet discoverer.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Enhance research, note taking, and reporting skills.	1.1 Research any comet discoverer.	1.1 WORLD BOOK ENCYCLOPEDIA, Vol. C, COMET KOHOUTEK, 1973-74, NASA Publication.	
	1.2 Read articles; take notes.	1.2 Paper, pencil.	
	1.3 Organize notes.	1.3 Individual conferences for proofreading, note taking and organizational skills.	
2. Report to class.	2.1 Individual reports to class.		
3. Write research paper.	3.1 Will write brief research paper to be handed in, based on report.	3.1 Paper, pencil.	

UNIT: OUTER SPACE

Step V. Lesson Plans

Sub-Unit: Exploration in Space - Grade 6

READING/LANGUAGE ARTS: Exploration in Space - Grade 6

ASSIGN. SCOPE OF LESSON STATEMENT Generate creative stories by utilizing vocabulary banks, reading specific materials and organizing information.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Read various books, pamphlets, and periodicals on topics that relate to space exploration.	1.1 Distribute, study and read a variety of pictures, brochures and information from NASA to students.	1.1 Free information available for this area by writing to: Education Office % Garth Hull NASA Ames Research Center Moffett Field, CA 94035	1.1 Order materials well in advance.
	1.2 Request that each student share orally most interesting information with the total class.		
2. Develop an on-going dictionary of space terms.	2.1 Design and decorate a cover to be used for dictionary of space terms.	2.1 Construction paper, markers. Laminate if possible and staple lined paper inside.	
	2.2 Use cover to bind blank paper for word entry.		
3. Write a fictional story and in the process develop characters and sequence of events. Story must relate to space travel.	3.1 Students divide into 3 groups and brainstorm possible stories and characters. One student is asked to volunteer record keeping.	3.1 Chart for record keeping.	
	3.2 Based upon the above experience, each student will work independently to write a fictional story.		
	3.3 From their story students are asked to verbally describe at least 2 main characters. This is taped on a cassette tape.	3.3 Blank tapes, tape recorder.	
	3.4 Students will then exchange story and tape with one student and read, then listen. They will then share ideas with one another.	3.4 Tape recorders.	3.4 This would have to be done over a period of several days so that students would have access to tape recorder.
	3.5 From the fictional story, each student will list the sequence of events as they took place.		

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READING/LANGUAGE ARTS: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Create an understanding of the history of the NASA space program.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Participate in NASA tele-lecture and view slides which accompany presentation.	1.1 Students will read a variety of information concerning the NASA space program.	1.1 See Reading/LA pg. 1 Objective 1.	1.1 Travel poster.
	1.2 Based upon the above information students will formulate written questions. They will then share at least 2 questions with the class. The class will then help each student to finalize on one well stated question which will be used during the tele-lecture.	1.2 Well in advance teacher would schedule tele-lecture via the information on Page 1. Necessary equipment includes a conference call speaker which Radio Shack is willing to loan to schools. Be sure to check wire compatibility with phone system. If arrangements be made, borrow a taped version with slides from Carol Lark - Monforton School.	
	1.3 Practice proper voice projection with conference call set up using students questions.	1.3 All equipment should be pre-tested.	
	1.4 At pre-arranged time have students with questions ready for tele-lecture. Slides should be set up and ready to go. When call comes in introduce speaker and run slides as he/she indicate. Following the 30 minute lecture with slides, speaker will listen to student questions and personally answer each one.	1.4 Speaker will call to confirm time and date. Always confirm time zone differences and be sure phone is not busy at time of designated call - notify office and principal.	
2. Write thank-you notes to NASA using appropriate grammar and penmanship.	2.1 Students will write thank-you notes for tele-lecture and mail to speaker.	2.1 Provide appropriate paper and envelopes.	2.1 Stress importance of grammar, spelling etc. in thank you notes.
	2.2 Examples of expectations would be displayed on overhead.	2.2 Overhead with pre-written transparency.	

MATH: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Introduce geometry as it relates to space exploration.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Develop a vocabulary list of words that relate to geometry.	1.1 Have students meet in small groups to develop two lists of words. a) List one will consist of words that describe geometric shapes, figures and shapes in relative position in outer space (brainstorm). b) List two will consist of words that do not describe geometric shapes in outer space.	1.1 a) Refer to solar system poster for relative position. 1.1 b) Refer to vocabulary list for list two.	1.1 Sphere, circle, radius, diameter line, are words easily recalled when discussing space. Other words that relate to space may be more difficult to identify immediately. 1.1 b) Emphasize comparison and contrast skills.
	1.2 As a large group have a representative from each small group put their list of words on the blackboard to form a common list of words for the class.	1.2 Use blackboard or flip charts - charts may be used in later lesson and would be preferable.	
	1.3 Students will then put at least two words from their list into sentences.		
2. Define each word on the class vocabulary list of geometry words.	2.1 Each student will write a definition for all the words on the list.		
	2.2 Review the definitions as a class discussion to determine acceptable definitions.		

MATH: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Understand the number and size of planets within our solar system.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Locate and utilize a planetary map for their own solar system to: a) Identify the planets according to size in diameter. b) Count the number of natural satellites for each planet. c) Construct a pictograph using the information in 1a and 1b.	1.1 Each child will cut out representative circles for each planet. Their sizes should be proportionally accurate. Each planet should be proportionally accurate. Each planet should be a different color.	1.1 Have a solar system poster available for reference.	
	1.2 Have child cut out representative circles for each natural satellite for each planet. The color scheme should match that of 1.1. Their size should be proportional.		
	1.3 Arrange the planet and satellite circles in an ordered graph and label and label it: a - size of planet; b - number of satellites; or c - distance from sun.		1.3 If time permits, teacher could use styrofoam balls and paint, label and hang from ceiling with fishing line in appropriate positions in relation to the sun.

MATH: Exploration in Space - Grade 6

ASSIGN. SCOPE OF LESSON STATEMENT Develop a time line of space exploration.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Based upon Reading/La pg. 2, Objective 2, student will construct a time line which depicts the history of space exploration.	1.1 Supplied with NASA information, students will construct a time line.		
2. Write two step verbal problems based upon space exploration and solve.	2.1 Students will write 2 step verbal problems which astronauts may encounter in space travel (will be written on cards). 2.2 Students will exchange cards from above and solve.	2.1 Provide rectangular cards which can be stored and used later.	2.1 Select best examples and laminate for use as a math activity.

MATH: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Converts whole numbers by use of expanded notation.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Convert whole numbers of planet distances by use of expanded notation.	1.1 Students will be introduced to conversion of whole numbers by use of expanded notation as presented in math basal text.	1.1 Use blackboard to teach lesson. Students will do several problems on board as examples to total class.	
	1.2 Given a ditto of solar system with whole number distances, students will duplicate distances on a second ditto using expanded notation.	1.2 Provide appropriate dittos of solar system.	
	1.3 Once dittos are completed a large poster board with solar system will be designed for hallway display.	1.3 Supply poster board and markers.	1.3 Develop posters through questionning technique - total class involvement.

SCIENCE: Exploration in Space - Grade 6

ASSIGN. SCOPE OF LESSON STATEMENT Illustrate the effect of gravity on space travel.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. List forces that could effect weight on a scale.	1.1 Ask volunteer to measure his weight on a scale. Ask him to measure again as you press down on his shoulders. Discuss why the weight changes.	1.1 Bathroom scale.	1.1 Key word is "force."
	1.2 Brainstorm on other forces that would also change the students weight on the scale.	1.2 I.e., lifting one foot, wind, etc.	
2. Define gravity and act out its effect on an object.	2.1 Interject "gravity" as another force. Ask for a class definition.		
	2.2 Begin throwing a tennis ball around the room. Ask students to throw the ball around the room. Ask students to throw the ball with different gravities.	2.2 Tennis or nerf ball.	2.2 Verbalize guidelines for throwing ball.
3. Calculate weights with different gravities.	3.1 Give an illustration of your weight on the moon (1/3 the gravity of earth). Let the students help you in determining how your weight would change. Use two more actual examples using students' weight.	3.1 The GUINNESS BOOK OF ASTRONOMICAL FACTS would serve as an aid to the teacher.	3.1 Jumping, density; i.e., bowling ball basketball.
	3.2 Assign the construction of an imaginary solar system of 5 planets with different gravities. Ask the students to calculate what 100 lbs. would weigh on each planet.		
	3.3 As a total group, share the solar systems created. Discuss the results.		

SCIENCE: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Provide a modeling experience that illustrates interplanetary distances based upon reference material.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Research and plot on a table the distances between each planet and the sun.	1.1 Review the order of the planets from the sun while writing their answers on the board.	1.1 Encyclopedias or other reference books.	1.1 Ask librarian to assist in gathering appropriate reference books.
	1.2 Divide the class into nine groups which will each be assigned the task of finding the distance of a planet from the sun. Plot the distances next to the name of the planet.		
2. Construct a scale representation of the distances down a hall or outside if weather permits.	2.1 Provide each group with construction paper and compasses. Assign the task of making a circle with the name of the groups planet on it.	2.1 9 pieces of construction paper, 9 scissors, 9 compasses, 9 magic markers.	2.1 You may prefer to have circles pre-cut and continue to step 2.2.
	2.2 From a prepared sun model at one end of the hall, have each group measure the distance down the hall to the point where their planet would be if the scale was 1 million miles to 1 cm.	2.2 Prepared sun model.	
	2.3 After observing the relative distances, discuss questions concerning space travel and the differences in models.		2.3 Questions might include: a) Why would someone call Mercury, Venus, Earth and Mars the inner planets? b) What information does this model give us? How is it different from our real solar system? c) When were each of the planets discovered? Would the planets' distance from the Earth have any effect on when it was discovered. NASA posters would be excellent to use at this point.

SCIENCE: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Based upon NASA research, compare the characteristics of different planets.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Compare the characteristics of Venus with the characteristics of Mercury based upon Mariner 10 research.	1.1 Based upon printed material provided by the teacher students are assigned to make the following four tests. a) Those things about Venus that are similar to those on Earth. b) Those things that are different. c) Those things about Mercury that are similar to those on the moon. d) Those things that are different.	1.1 Ditto appropriate material for students. Recommended material includes: Science-Math Resource Center: THE NEW FRONTIER - NASA, 433.86, NASA/10-12.	
	1.2 Make a drawing or painting of your impression of the surface of Mercury.	1.2 Provide paper, marker, watercolors, etc.	

SOCIAL STUDIES: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Develop an awareness of the current space program.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Demonstrate an understanding of what is happening in our current space program.	1.1 Divide students into small groups and provide each group with information concerning a specific NASA program.	1.1 NASA will provide teachers with a packet of numerous pamphlets, photos, bulletins, etc. Free of charge. Request information. See: Reading/LA p. 1, Objective 1.	
	1.2 Assign each group to construct a chart or diagram which depicts one aspect of the current space program.	1.2 Provide paper, markers, etc.	
	1.3 Upon completion each group will orally present and explain their program to the class.		
	1.4 Following all presentations the class will discuss the current space program and make some predictions.		

SOCIAL STUDIES: Exploration in Space - Grade 6

ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of how a flow chart can be helpful in presenting information.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create a flow chart that would explain the development of the NASA space program.	1.1 Review with students the information presented in the NASA tele-lecture.	1.1 Refer to Reading/LA, p. 2, Objective 1.	
	1.2 Teacher will demonstrate on an overhead an example of a flow-chart using familiar information.	1.2 Overhead, projector with prepared example.	
	1.3 Based upon above information each student will be assigned to develop a flow-chart of the NASA program.		
	1.4 Ask volunteers to demonstrate and explain their flow-chart to the entire class.		

SOCIAL STUDIES: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Develop writing and speaking skills by utilizing space information.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Write and deliver a speech which deals with space exploration.	1.1 Based upon experience of flow-chart from Social Studies, p. 2, ask students to further research one aspect of space exploration and write a 2 minute speech.		
	1.2 Students exchange written speeches and proofread for each other. Allow time for students to share with one another any suggestions or corrections to their written work.		
	1.3 Assign each student to then write a final draft of their speech and be prepared to orally present it in 2 days.		
	1.4 Students will be videotaped (if possible) as they present their final speeches.	1.4 Video tape, camera.	1.4 Be sure microphone is close enough.
	1.5 Together the class will critique the video speeches.	1.5 Video machine. Evaluation forms which should include items such as: posture; diction; mannerisms; poise; eye contact; content; organization.	1.5 Be sure to set positive guidelines for critique. Evaluation forms would be helpful.

SOCIAL STUDIES: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Recognize the relationship between rights and responsibilities as it applies to space exploration.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Realize the importance of understanding the relationship of rights and responsibilities which man must consider as he explores space.	1.1 Discuss with students what has happened to Earth as a result of man's presence.		
	1.2 Brainstorm and list on the blackboard several of the problems which man is faced with today as a result of man's impact on his environment.		
	1.3 Following the discussion ask students to list all of the potential problems which face man as he explores space.		
	1.4 Ask students to share their concerns with their classmates.		

ARTS: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Develop imagination through creating imaginary space creatures.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create imaginary plaster coated space creatures.	1.1 Students will construct imaginary space creatures from recycled objects.	1.1 Recycled items: toilet paper rolls, egg cartons, etc. straws, tagboard, scissors, masking tape, plaster of paris, paint, brushes.	1.1 Explain the process of fantasy based on reality.
	1.2 Dip animals in plaster of paris and dry.		
	1.3 Paint and display.		

ARTS: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Encourage creativity through use of poster designs.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create a poster that reflects the work of the NASA program.	1.1 Students will first view a variety of NASA pictures and then do a preliminary drawing which depicts some aspect of the NASA program.	1.1 Refer to material suggestions on Social Studies, p. 1, (1.1). Sketching paper, pencils.	1.1 Bulletin board with NASA materials would be ideal to stimulate interest.
	1.2 From original drawings, students are directed to create a final poster using markers, paints, pens, etc.	1.2 Poster board, markers, paint, etc.	1.2 Display posters in prominent place in school.

ARTS: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Stimulate imagination and creativity by designing something for the future using the medium of clay.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create a model of a futuristic space vehicle using the medium of clay.	1.1 Students will experiment with and ultimately create a model of a futuristic space vehicle using clay.	1.1 Provide protective material for desks and clay.	1.1 Display several examples of existing space vehicles to stimulate interest.
	1.2 Each student will show his vehicle to the rest of the class and explain its proposed uses.		

MUSIC: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Provide students with opportunity to create lyrics based upon theme.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Write the lyrics to a song about space exploration.	1.1 Review, through discussion, the history and future of the space program.		
	1.2 Assign each student one verse of lyrics to be written about space exploration.		
	1.3 Share verses with the total class and together try to sequence verse and develop a space song.		1.3 Depending on the personalities in a class, you may wish to ask for volunteers who would be willing to practice and ultimately sing the song to the total class.

MUSIC: Exploration in Space - Grade 6

ASSIGN. SCOPE OF LESSON STATEMENT Expose students to creative movement using space theme.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Participate in creative movement as imagination depicts space travel.	1.1 Discuss what type of movement might take place in zero gravity.		
	1.2 Ask students to use their imaginations and move about the room as they might imagine movement in space. Provide appropriate background music.	1.2 Record or tape; i.e., COSMOS for background music. Try to avoid lyrics if possible.	1.2 Move desks to outer edges of room or use gym.

MUSIC: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Encourage fluent thinking by inventing a new instrument.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create some type of music using their own invented instrument which could be used during space travel.	1.1 Students will create sound by inventing one instrument which could be used in space.	1.1 Provide a variety of recyclable materials.	
	1.2 Each student will demonstrate the use of their instrument.		
	1.3 Entire class will "play" in unison.		

HEALTH AND PHYSICAL EDUCATION: Exploration in Space - Grade 6

ASSIGN. SCOPE OF LESSON STATEMENT Provide an opportunity for students to combine creativity with physical awareness.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Develop original games which could be played during space travel.	1.1 Discuss the elements of games which would contribute to exercise in space travel. Be sure to include in the discussion of gravitational factors and space limitations.		
	1.2 Have each student design their own game and write it up.		1.2 Provide material as requested if possible. Ideas should be generated from students.
	1.3 Share a variety of games with the class and discuss the appropriateness of each game.		

HEALTH AND PHYSICAL EDUCATION: Exploration in Space - Grade 6

ASSIGN. SCOPE OF LESSON STATEMENT Encourage students to project into the future incorporating physical needs.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Plan a physical fitness program for a future space colony.	1.1 Review the physcial fitness programs as we understand and use them on Earth.		
	1.2 Ask each student to list the most important elements of a physical fitness program.		
	1.3 Given their lists, students are assigned to plan a one month program of physical fitness for a new space colony.		1.3 Discuss what a "space colony" might be like; i.e., number of people, housing, energy, etc.

HEALTH AND PHYSICAL EDUCATION: Exploration in Space - Grade 6
ASSIGN. SCOPE OF LESSON STATEMENT Encourage physical fitness through participation in a "space" game.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Participate in a physical game centered around a space theme.	1.1 Set up 5 stations as follows: 1) jump rope 10 times; 2) do 5 jumping jacks; 3) arrange hoops like tire - 3 sets for running through. 4) dribble basketball for 2 minutes; 5) 10 pushups.	1.1 Jump rope, hoops (6), basketball, 5 planet signs with directions.	
	1.2 Each station would be labeled as a planet. Final station would be Earth.		
	1.3 Students begin in outer space and attempt to reach earth in the shortest amount of time possible.		

UNIT: OUTER SPACE

Step V. Lesson Plans

Sub-Unit: Astronomy - Grade 7

READING/LANGUAGE ARTS: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop book reporting skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Read a science fiction book dealing with outer space.	1.1 Visit the school library and let students select a science fiction book to read.		1.1 Good teacher read aloud book.
	1.2 Have students bring science fiction books from home for exchange reading.		
2. Write about the book using assigned tasks.	2.1 Write a job resume for a story character.		
	2.2 Write an autobiography for a story character.		
	2.3 Write a report on what you think the main character will be like in 10 years.		
	2.4 Write a letter to the mayor nominating a character in the book to be "Citizen of the Year."		2.4 Review business letter form.
	2.5 Write the ways they would have acted differently if they were the main character.		

READING/LANGUAGE ARTS: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop reading and research skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Define the term astronomy.	1.1 Display books, periodicals, posters, etc., about the classroom. Allow children to look through books. Generate a discussion on the meaning of the word astronomy. Write definition on experience chart or board.	1.1 Books, periodicals, posters, experience chart, pens, or chalkboard and chalk.	
2. List early astronomers and report on their contributions to the field of astronomy.	2.1 Allow children to look through reading materials available and list the names of astronomers regularly mentioned. List on experience chart or board, briefly list some of their contributions.	2.1 Reading materials on topic, experience chart or board.	
	2.2 Have each child choose the name of an astronomer on whom they wish to report on that person and his contributions to the field. Each child should have a different astronomer. Reports could then be given orally to class.	2.2 Research materials, writing paper, pencils, etc.	2.2 May be a good lesson to take to public library to research for information.

READING/LANGUAGE ARTS: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Create an understanding of astronomy vocabulary.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Identify and assemble astronomy related vocabulary words.	1.1 Students will start an "Astronomy Dictionary." They should list each vocabulary word they encounter in the unit. The definition of each word should be included. 1.2 When unit is complete, have students put the dictionary in alphabetical order.	1.1 Writing paper.	1.1 These vocabulary lists make terrific "bonus" spelling words.

READING/LANGUAGE ARTS: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Generate creative writing stories.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Write creative stories using independent story starters.	1.1 Discuss and review the 5 W's of good story writing. Record on chalkboard.	1.1 Chalkboard, chalk.	1.1 Who, what, when, where, why.
	1.2 Discuss the possibilities of traveling back in time.		1.2 It is not possible to travel back in time. However, it takes light from the stars a long time to reach Earth.
	1.3 Assign students the following independent story starter: "You are gazing at the stars and suddenly you are transported back in time."		
	1.4 Have students write about their adventure "back in time."	1.4 Writing paper.	
	1.5 Illustrate stores.	1.5 Drawing paper, colored pencils, markers.	

READING/LANGUAGE ARTS: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop an appreciation for our universe through literature.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. **Read books** pertaining to the universe.	1.1 Select numerous books and articles about our universe to be placed at a resource table where students have access.	1.1 Numerous books and astronomy and our universe, display table.	
	1.2 Have students bring in books and articles from home to share with the class.		
	1.3 Display newspaper articles on a bulletin board.	1.3 Bulletin board.	

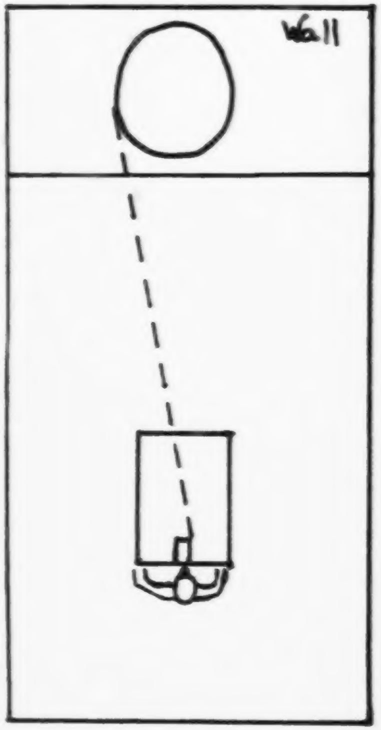
READING/LANGUAGE ARTS: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Practice on parts of speech.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Develop proficiency in listing examples of nouns and adjectives.	1.1 Review the definition of a noun and an adjective and give example.		
	1.2 Record definitions and examples on the board.	1.2 Chalkboard, chalk.	
	1.3 Show posters/pictures to the class for a few minutes, then put it away.	1.3 Astronomy related pictures large enough for the class to see clearly.	1.3 NASA's teacher's packet is a great source for posters! It's free for the asking.
	1.4 Ask students to write all the nouns they remember seeing in the pictures.	1.4 Writing paper, pencils.	
	1.5 Ask students to describe those nouns, using descriptive adjectives.		
	1.6 Share results in class discussion.		

READING/LANGUAGE ARTS: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop poetry writing skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Learn about the many poetic forms.	1.1 Generate a class discussion on the many poetic forms.		1.1 Common Poetic Forms: a) Free Verse; b) Couplet; c) Haiku; d) Tanka; e) Senryu; f) Cinquain.
2. Write poetry from an assigned topic.	2.1 Have students write a poem describing a trip to another known galaxy.	2.1 Writing poem.	
	2.2 Record poems on yellow construction paper with a specific shape cut out by each student to represent his poem.	2.2 Yellow construction paper, scissors, pencil.	
	2.3 Display on a bulletin board.	2.3 Bulletin board.	

MATH: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Investigate sizes of various planets.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. **Measure the diameter of the moon or a planet without going there.**	1.1 Generate a class discussion on how one measurement depends on another.		1.1 If an astronomer knows the distance to the moon, he can find its diameter.
	1.2 Do the following experiment: a) Cut the paper so that it is as long in inches as the room is in feet. (If your room is 32 ft. long, the paper should be 32 in. long). b) Fasten the paper circle to the rear wall of the room. c) Push a pin through one end of the straw into the middle of one edge of the paper. d) Stand at the middle of the front wall. Sight through the straw at the left edge of the circle. While you hold steady, somebody draws a line against the straw. e) Without moving the paper, turn the straw so that you can sight through it to the right edge of the circle. Again someone draws a line against the straw. f) With a yardstick continue the 2 lines to the far end of the paper. g) Measure the distance from the end of one line to the end of the other line. Change inches to feet and you have an estimate of the diameter of the "distant planet."	1.2 Stiff paper, four feet long and one foot wide; straw; pin; a large paper circle 3 or more feet in diameter; pencil.	1.2 

MATH: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Introduce and develop the concept of light years.

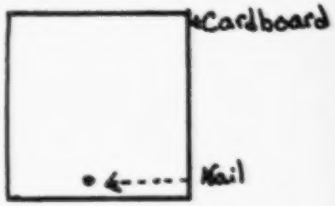
OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Discuss the concept of light years.	1.1 Generate a class discussion on light years. Note: A light year is a measurement of distance, not time.		1.1 Note: This would be a good time to teach exponents and scientific notation.
2. Compute distances in light years.	2.1 Students will compute light years using a worksheet handout.	2.1 Teacher will make up a handout sheet.	2.1 To convert the distance light travels in one year (a light year) use this formula: Speed of light = 3000,000km. per second (186,300 mi/per sec.). Speed of light x 60 = ____km/min. ___km/min x 60 = ___km/hour ___km/hour x 60 = ___km/hour ___km/day x 365 = ___km/year Teacher: utilize the above formulas to construct problems for your worksheets. *Check answers using a calculator.

MATH: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop computational skills.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create a diagramatic model of the sun and the planets.	1.1 Allow students to use resource materials in the classroom to find out the distances of the various planets from the sun. Also find out the respective sizes of the planets.	1.1 Resource books, periodicals, etc., on topic, experience chart, pens.	
	1.2 Develop a model of the sun and the planets. Begin by making a sun that is 27" in diameter and let each inch represent 20 million miles. Using this criteria to develop solar system model. (How many times bigger is the sun than earth? How big would the earth be if the sun were 27"? If earth is so many miles from the sun where would it be if each inch were 20 million miles? etc.) Use to develop computational skills.	1.2 Large wall area or bulletin board to display model, measuring devices, compasses, pencils, pens, scratch paper.	1.2

1.2	Diameter	Distance
Sun	27"	-
Mercury	1/8"	1 3/4"
Venus	1/4"	3 1/4"
Earth	1/4"	4 3/4"
Mars	1/8"	7"
Jupiter	2 3/4"	2′
Saturn	2 3/8"	3′8"
Uranus	1"	7′5"
Neptune	7/8"	11′8"
Pluto	1/8"	15′3"

MATH: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of telling time by using a sundial.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Discover the components of the sundial and record the definitions.	1.1 Generate a class discussion about the sundial.		1.1 Some terms related to the sundial include: Egypt, base bar, shadow, gnomon, crossbar, north, south, east, west, plane, dial face, North Pole, Northern Hemisphere, South Pole, Southern Hemisphere, quarter hour, angle, slant, parallel, latitude, equinox.
2. Make a sundial.	2.1 Make a sundial using the following steps: a) In the morning put the cardboard in a place where the sun will shine on it all day. b) Glue the head of the nail near the edge. Make sure this edge always faces south. c) Every hour, trace the shadow made by the nail. d) Write the time next to each tracing. e) Look at the sundial on another sunny day.	2.1 Cardboard, nails, glue, clock, sunny day.	2.1 You may want students to bring in materials several days before the activity begins.  When looking at the sundial on another sunny day, students will most likely notice that the sun shines on the nail so that a shadow of the nail falls on the cardboard near a number that corresponds to the number of the hour at that time. Have students infer that a sundial works in this way because the sun shines from different parts of the sky at different times during the day.

MATH: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of telling time by using a sundial (continued).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
3. Write a report reflecting knowledge learned.	3.1 Generate a class discussion on this method of telling time. 3.2 Have students write a report on sundials as a way of telling time.		3.1 Students may want to include other ways to tell time.

SCIENCE: Astronomy - Grade 7

ASSIGN. SCOPE OF LESSON STATEMENT Create an understanding of the color of stars.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Observe how stars differ in color.	1.1 Heat a wire until it glows. It will glow orange at first, then as it becomes hotter, it will glow yellow.	1.1 Wire, lamp.	1.1 Science-Math Resource Center: SCIENCE FOR THE ELEMENTARY SCHOOL, Victor, Edward.
	1.2 Turn on a table or gooseneck lamp with the shade removed, that has a light bulb of clear glass so that the wire inside can be seen.		1.2 To show how color affects brightness, obtain a string of Christmas tree lights with different color bulbs. Have students compare the brightness of the bulbs in a darkened room.
	1.3 The extremely hot wire will glow a yellowish white.		1.3 To show how color changes with temperature, ask the students to watch a toaster or similar appliance heat up. Point out that our hottest stars are blue-white and white, and as they become cooler, they turn yellow, orange, and then red. See: A UNIVERSE TO EXPLORE, pp. 54-56, Science-Math Resource Center - for more experiences in star temperature. 421.12, HRW/7-9, 1976.
	1.4 Observe and record results in notebooks.	1.4 Notebooks, pens.	

SCIENCE: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Provide understanding of constellations.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create a night sky.	1.1 In the study of stars and constellations, include a night sky. Find a picture of a night sky or a single constellation.	1.1 Construction paper, needle, overhead projector.	1.1 After discussing the constellations, you may wish to have the students research mythological characters whose names have been given to many of the constellations. The pupils may find out about these characters by looking in reference books under the headings of the individual constellations such as "Pegasus" or "Perseus" or under the heading "Mythology."
	1.2 To make each star, poke a hole into a piece of construction paper with a needle.		
	1.3 Turn out the lights and place the paper on the overhead. Light will shine through the holes onto the ceiling.		

SCIENCE: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop an understanding of constellations.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Review recognition of constellations.	1.1 Review the recognition of constellations by playing "Around the World."	1.1 Overhead projector, transparencies of constellations.	
	1.2 Use an overhead projector and show transparencies of different constellations.		
	1.3 Two students each try to name it first. The winner takes on another challenger.		

SCIENCE: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Create understanding of starlight.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Construct a star brightness indicator.	1.1 Divide cardboard into six parts.	1.1 Piece of lightweight cardboard, ruler, penny, clear cellophane or plastic.	
	1.2 Trace a circle in the center of each part with the penny.		
	1.3 Fold the cardboard and cut out the circles.		
	1.4 Cut out six strips of cellophane.		
	1.5 Tape the first strip to cover all six holes, the third to cover four holes, the fourth to cover the three holes, the fifth to cover two holes, the sixth to cover one hole.		
	1.6 Look at the stars. If you can see one through the six-layer hole, it it a bright star. We call this kind of star a first-magnitude star. Check stars to see which hole you can see them through.		

SCIENCE: Astronomy - Grade 7

ASSIGN. SCOPE OF LESSON STATEMENT Develop knowledge of telescopes.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Discuss kinds of telescopes and their uses.	1.1 Discuss with the class the three kinds of telescopes and the advantages/disadvantages of each.		1.1 View a film on telescopes, planetariums, or observatories.
	1.2 Discuss what uses three telescopes are best suited for.		1.2 Make inquiry of someone local who owns a telescope and can come to class and demonstrate. Refractor telescopes are best suited for the accurate measurement of small angles when locating an object position in the sky. Reflector telescopes are best suited for photographing faint surfaces in less time than refractors can. Schmidt telescopes can be made to produce excellent images over a large field and can record a large area of the sky on a single photo that would require 400 photographs if recorded by the largest reflector telescope.
2. Write a report on the Schmidt telescope.	2.1 Have students research and write a report on the Schmidt telescope.	2.1 Writing paper.	

SCIENCE: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop knowledge of telescopes (continued).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
3. Make a telescope.	3.1 Have students make a telescope. a) Make a tube out of cardboard and tape. Tube should be about 10 inches (25 centimeters) long. It should be wide enough for one of the hand lenses to fit tightly inside. b) Make another tube about 25 centimeters long. This tube should be able to fit tightly inside the first tube but should be wide enough for the other hand lens to fit inside. c) Tape a hand lens to one end of each tube. d) Put the tubes together and you have a telescope.	3.1 Two hand lenses, thin cardboard, scissors, tape.	3.1 The combination of a thick convex lens and a thin convex lens will produce the best results. Catalog from Edmond Scientific Co. is available in the Science-Math Resource Center (to order lenses).
4. Observe and record using their hand-made telescope.	4.1 Look at some stars through your telescope. Record your observations. Note: move the inside tube in and out until you can see the stars clearly.		4.1 Observe: How is looking at stars with the telescope better than looking at stars without the telescope? You might want students to write a hypothesis before using telescope.

SCIENCE: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of a black hole.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Define the term "black hole."	1.1 Allow students to use resource books and magazines in the classroom to find a definition of a black hole. Develop and discuss as a class and write on experience chart. What evidence is there that black holes exist? What kind of events have occurred which indicate the existence of black holes? etc.	1.1 Resource books, etc., experience chart, marking pens, etc.	1.1 Black Hole - remains of a star whose gravity is so strong that nothing can escape from it, even light is trapped, increased density from collapse results in exceedingly strong gravity which may even be strong enough to trap nearby objects such as a passing comet.
2. Write a creative story about a black hole.	2.1 Generate discussion on definition of black hole. If they exist, what causes them? Have students imagine that they are a space traveler who journeys too close to a black hole. What happens when the hole's immense gravity begins to pull them in? Coordinate as language arts activity. Use many descriptive words; invent some of your own. Illustrate the view from the spaceship window as a cover for the story.	2.1 Writing paper, illustrating paper, pencils, pens and markers or colors.	

SCIENCE: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of changes in star size.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Learn how a star changes in size over billions of years.	1.1 Generate a class discussion on how stars of the same age also are about the same size.		1.1 Young stars are generally medium sized stars. Middle age stars are often giants. Very old stars are dwarfs. Astronomers note that stars in a galaxy seem to vary in age, but all stars of the same age seem to be in the same vicinity.
	1.2 Have some students prepare a bulletin board display of the development of a star from a medium sized star to a giant star to a dwarf.	1.2 Bulletin board, construction paper, scissors.	
	1.3 Have some students develop a model showing the range of sizes within each category of stars. Use a certain size, such as a centimeter, to depict the sun. Show various medium sized stars, anywhere from below 10 centimeters down to one millimeter. Giant stars would vary from 10 centimeters up to one meter. Dwarf stars would hardly show.	1.3 Student's choice of materials for a model.	
	1.4 Have students name some of the stars on the bulletin board and the model. Record.	1.4 Writing paper.	1.4 Use reference books.

SCIENCE: Astronomy - Grade 7

ASSIGN. SCOPE OF LESSON STATEMENT Develop interest in astronomy.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Observe the night sky and discuss observations.	1.1 About two weeks before starting this unit, have the students observe the sky each night.		1.1 Form skywatching groups and arrange to meet at one another's home on a clear night. Invite a parent/teacher (amateur astronomer) to speak to the group.
	1.2 Have them make observations from the same location at the same time each evening.		
	1.3 Draw pictures, make notes and record questions in a notebook.	1.3 Notebooks, pencils.	
	1.4 The students can display their work on a bulletin board with the caption "What Did You See Last Night?"		
	1.5 Discuss observations.		

SCIENCE: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Create an understanding that constellations change position.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Observe how the constellations seem to change their position.	1.1 Observe the position of constellations such as the Big and Little Dippers or Orion, early in the evening and then later in the evening.		1.1 The constellation positions will have changed due to the earth's rotation.
	1.2 Observe their positon 1 night each week for 4 weeks at the same time each night.		1.2 Give each student a transparency to record star positons. This apparent change is caused by the earth's revolution around the sun.
	1.3 Discuss and record observations.		1.3 An excellent star chart called the "Star Explorer" can be obtained inexpensively by writing to: Star Explorer/Hayden Planetarium/ New York, NY 10024 It has excellent instructions and can be adjusted for different times of the year. Use this star chart to locate constellations in the sky.

SOCIAL STUDIES: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop awareness of the history of the calendar.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Investigate the validity of the solar calendar.	1.1 Generate a discussion on the longest year in history (46 B.C.). Why did it end up being 445 days long?		1.1 An additional activity might be to invent a new calendar based on the motion of the moon, some planet or some other regular occurrence. Give the days and months appropriate names. Determine how many days would be in your week; how many months?, etc. May even invent a clock to tell your particular time. Could be used to show the importance and difficulties of developing a calendar. (Students could make their own holidays, etc.).
	1.2 Develop a worksheet covering further development of the solar calendar. (Julian calendar and subsequent Gregorian calendar, leap year rules, etc.).	1.2 Worksheet, pencils.	
2. Demonstrate knowledge of calendar facts by playing calendar trivia.	2.1 Discuss the game TRIVIAL PURSUIT's rules, how many students have played it, etc. Instruct students to develop their own calendar trivia game by writing calendar related questions on 3"x5" cards and placing in game box (many will be needed). Play in groups of 3-5, using current calendar as a gameboard. The first one through the current season wins.	2.1 3"x5" cards, calendar, game pieces for markers, box for game cards, dice.	

SOCIAL STUDIES: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop awareness of the history of the calendar (continued).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
3. Investigate the lunar calendar.	3.1 Generate a discussion on the measurement of time. Discuss the calendar - how long have we used it? Introduce the terms "lunar calendar" and "solar calendar." Why did calendars have 13 months at one time? Allow students to read and research to answer this question. Have them write a paragraph to be handed in.	3.1 Experience chart or board and writing materials, resource books, periodicals, etc.	3.1 Bozeman Public Library: ABOUT THE HISTORY OF THE CALENDAR, A.E. Evenson, Children's Press, Chicago, 1972. J, 529, E.
	3.2 Have the students pretend that they are the ruler of the Roman Empire. Instruct them to write a decree to the people of the empire explaining why and when the month of Mercedonius should be included in the Roman calendar.	3.2 Resource books, materials, writing paper, pencils.	3.2 Roman rulers often added the month of Mercedonius too often in order to extend their terms of office, or deleted it in order to collect taxes more often.

SOCIAL STUDIES: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of a polar map.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Learn about a polar map.	1.1 Generate a class discussion on how the world would look if you were in the space shuttle circling over the North Pole. 1.2 Review such terms as parallels of latitude, prime meridian, meridians of longitude, the equator, degrees, etc.	1.1 Picture of a polar projection map.	1.1 Why is the North Pole in the middle on a polar projection map, instead of at the top. 1.2 Develop hand out sheets with questions on locating specific places using degrees of parallels and meridians.
2. Make a polar projection map.	2.1 Have students make and label their own polar projection map.	2.1 Drawing paper, pencil, colored pencils, compass, ruler.	2.1 Display or make copies of a polar projection map for a reference for students use.

SOCIAL STUDIES: Astronomy - Grade 7

ASSIGN. SCOPE OF LESSON STATEMENT Develop awareness of career options available in astronomy.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. List careers available in the field of astronomy.	1.1 Allow students to use resource materials available in the classroom to develop a list of related careers. Write on experience chart or board. This should include a brief description of the career itself.	1.1 Experience chart, marking pens, board, chalk.	1.1 Information about careers in astronomy can be obtained from American Astronomical Society, Princeton, NJ.
2. Create a list of educational requirements for careers in astronomy.	2.1 Generate a discussion based on list developed above. What are the educational requirements for these careers? List on board or experience chart.	2.1 Experience chart, marking pens, board, chalk.	
3. Write a research paper in a chosen career in astronomy.	3.1 Allow each student to choose a career of interest related to the field of astronomy and write a report on it. Questions such as these should be covered: What subjects should you be taking now? What college or university would you attend? How many years of education will you need? What kind of wages could you expect to receive?	3.1 Research materials, writing paper, pencils.	3.1 This could be expanded to include writing a letter of application to a particular agency for a job. It might even be used to write imaginary want ads, "Star Struck individual looking for work with celestial bodies, etc." The students should be encouraged to stretch their imaginations on this - assume they could choose any college to attend, get a job of their choice, in a location of their choice. Where would they go? What would they hope to discover?

SOCIAL STUDIES: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of a universal address.

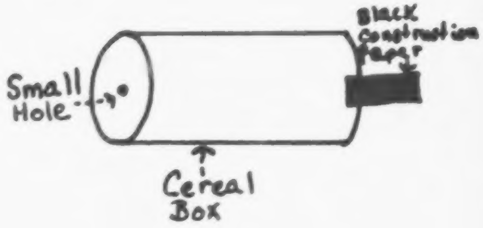
OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Write your universal address using specific steps and order.	1.1 Discuss with students the purpose of using addresses. List these purposes on the chalkboard.	1.1 Blackboard, chalk.	1.1 Include purposes such as mailing letters, finding the location of specific stores, locations for providing emergency vehicles, etc.
	1.2 Review the use of resource materials such as maps, phone books, globes, zip code directories, etc.	1.2 Maps, globe, phone book, zip code directory.	
	1.3 Remind students that in writing a universal address they begin with very specific and move to the more general.		
	1.4 Have students write their universal address using the specific steps and order in the experience chart on the right side of this sheet.		1.4 a. name b. seat number c. room number d. school name e. school address f. city g. township h. county i. state j. nation k. continent l. hemisphere E/W m. hemisphere n. longitude o. latitude p. planet q. planet system r. galaxy s. galactic group t. universe You may have to clarify concepts such as hemisphere, continent, longitude, etc., for some students.
	1.5 Compare your universal address with other students in your class and school.		

ART: Astronomy - Grade 7

ASSIGN. SCOPE OF LESSON STATEMENT Provide opportunity for artistic expression.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create a spaceship.	1.1 Display pictures of spacecrafts on bulletin board.	1.1 Bulletin board.	
	1.2 Students will create and construct a spaceship from easily obtainable materials.	1.2 Recycled items such as toilet paper tubes, boxes of various sizes, packing crates, lumber, cardboard, aluminum foil, etc.	1.2 Students may want to act out stories or poems using the spaceship constructed as a prop.
2. Draw a diagram of a spaceship.	2.1 Discuss the Adromeda Galaxy.		
	2.2 Have students draw a diagram of a spaceship you might use to travel to the Andromeda Galaxy.	2.2 Drawing paper, colored pencils.	2.2 Note: The Andromeda Galaxy is called a twin galaxy because it is about the same size and shape as the Milky Way galaxy.
3. Create a "rubbish robot."	3.1 Create a "rubbish robot" using good "junk," throw-aways, old pieces of toys, etc.	3.1 Old junk and throw-aways, old pieces of toys, egg and milk cartons, meat trays, bottlecaps, etc.	3.1 Help might be needed in figuring out how to attach things to each other.

ART: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Provide experience making a planetarium.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Make a planetarium.	1.1 Review the purpose of a planetarium through class discussion.		
	1.2 Discuss the difference between a planetarium and an observatory.		1.2 A planetarium is a special theatre where space objects are projected and people describe what is being seen.
	1.3 Cut two slits (one on each side) in a round oatmeal container, about 3 to 4 cm. from the end. Cut pieces of black construction paper to dimensions which will allow them to slide through the slits (about 7x12 cm). Use a pencil to make holes in the paper to represent stars in a galaxy. Cut a penny size hole in the bottom of the cereal container. Insert the paper and look through the hole toward a light.	1.3 Round oatmeal containers.	1.3 

ART: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Develop concept of constellations through art project.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create a constellation pattern.	1.1 Mark a constellation pattern on the bottom of the box.	1.1 Flashlight, empty salt box, several sizes of nails, pencil, pictures of constellations.	1.1 Some children might punch holes in the bottom of a tin can to represent constellations (hammer, nails). A flashlight can then be used to project the constellation onto the ceiling or a sheet of dark paper.
	1.2 Punch one hole for each star in the constellation. Use large nails for bright stars, small nails for dim stars.		
	1.4 Turn on the flashlight and place it inside the box. (Tip the light so it shines on the inside).		
	1.5 Take the box into a dark room.		
	1.6 Point the box holes up toward the ceiling.		1.6 Make other constellations or make up your own star patterns.
	1.7 Discuss what you see.		
2. Create constellation slides.	2.1 Have the children use processed, but nonexposed, black 35mm slides.	2.1 Processed but nonexposed, black 35 mm slides, needle.	
	2.2 Poke small needle sized holes in the slides to correspond to star positions in the constellations.		2.2 The proportions will not be accurate, but the relative positions of the stars should be.
	2.3 View and discuss the constellation slides.		
3. Create the shape of a constellation.	3.1 Have the students cut 16-guage wire with cutting pliers into 12 to 24 inch lengths.	3.1 16 guage wire, cutting pliers, pre-cut construction paper stars, glue, clothespins.	
	3.2 Bend these into the shape of a constellation.		
	3.3 Glue pre-cut construction paper stars to the appropriate points.		
	3.4 Hold them in place with clothespins		

MUSIC: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Provide opportunity to create lyrics.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create an original song.	1.1 Generate a class discussion on students' favorite commercials and corresponding jingles.		1.1 It would be nice if the teacher could pre-video record catchy TV commercial jingles.
	1.2 Have students write a promotional jingle for a travel agency sponsoring trips to outer space.	1.2 Writing paper.	

HEALTH AND PHYSICAL EDUCATION: Astronomy - Grade 7
ASSIGN. SCOPE OF LESSON STATEMENT Experience and learn the game "Star Wars."

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Demonstrate knowledge of the skills and rules of Star Wars by playing a game during P.E. time.	1.1 Explain playing rules of Star Wars. Play several games.	1.1 Large playing area, as many nerf balls as possible, two boffers/sticks or such to be used as light-sabers.	1.1 Game rules for Star Wars: Set up galactic boundaries to create two large areas, each occupied by an army. A line separates the two areas and all the nerf balls are placed on this line. (These balls are death stars). One person of each team is chosen as a Jedi Knight - Luke of the rebels and Darth of the Empire. Each of the knights is given a boffer and has a designated part of his playing area to be used as a star base (free zone). When a signal begins the game both armies go to the dividing line to get as many death stars as possible. They throw them at the opposing team, if a person is hit by a ball he is immediately frozen (in a time warp). He can only be unfrozen by his Jedi Knight when touched with a boffer. The Jedi Knight must hop on one foot out to touch a frozen soldier. Jedi Knights are safe at their star bases but if hit by a death star while trying to unfreeze a soldier, he is frozen for good. The knights must be protected while traveling. (Objects to keep your knight free but freeze the opponent).

UNIT: OUTER SPACE

Step V. Lesson Plans

Sub-Unit: Science Fiction - Grade 8

READING/LANGUAGE ARTS: Science Fiction - Grade 8
ASSIGN. SCOPE OF LESSON STATEMENT Introduce the idea of the need for science fiction.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Expose students to a variety of science fiction; i.e., books, records, videos, accompanying with bulletin board.	1.1 Set up a science fiction display with science fiction music playing in the background; i.e., (2001 Space Odessy).	1.1 "2001" recording, public library. Books, pictures, art work.	
	1.2 Divide students into small groups assign each group to the task of reporting information from science fiction books. Which would apply to science as we know it today; i.e., gravity, weightlessness, principles of flight and future use of space.		

READING/LANGUAGE ARTS: Science Fiction - Grade 8
ASSIGN. SCOPE OF LESSON STATEMENT Explore and compare fantasy and reality in science fiction.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Read and report orally and written on a science fiction book of choice comparing fantasy and reality based on scientific knowledge today.	1.1 Itemize documented fact and opinions found in individual readings. 1.2 Construct a model of a tool, spaceship, etc., as described in the above report. Prove or disprove its feasibility.	1.1 Consult librarian for suggested book list.	

MATH: Science Fiction - Grade 8
ASSIGN. SCOPE OF LESSON STATEMENT 1. Develop understanding of use of geometric shapes in design, purpose, and construction.
2. Analyze shapes for: usability, structural strength, ease of construction.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Create drawings to illustrate SciFi readings, using geometric shapes.	1.1 Choose one section of book to illustrate. 1.2 Design, keeping in mind utility and purpose of object drawn.	1.1 Book of choice paper, pencil, compass, protractor, straight edge. 1.2 Compass, protractor, straight edge.	
2. Analyze structural design for: utility, structural strength, and which geometric figure is best for which purpose, i.e., for support, O for openings, etc.	2.1 Create a 3 dimensional model of drawing. 2.2 Using scale model, test for utility, structural strength ease of construction.	2.1 Popsicle sticks, toothpicks, wire, string, etc. 2.2 Weights, water, fan for wind source, any other creative ideas that serve as stress tester.	2.1 Materials to fix model of child's design.

MATH: Science Fiction - Grade 8
ASSIGN. SCOPE OF LESSON STATEMENT Develop understanding of how profits are figured: gross, cost, net.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Determine net profit as publisher of Sci Fi book.	1.1 Organize a variety of publishing companies based on market demand; i.e., comics, magazines, Sci Fi buffs, that will bid on publication rights for 10 books. 1.2 Each company will be given $1500.00 as assets to set up business. 1.3 Itemize production costs: Paper, vary per type of book; ink; paper, colored pens; employees; printer; illustrator; type-setter; proofreader; book binder; president; secretary; publicity; advertising costs; poster; TV; radio; spots; magazine/newspaper ads. 1.4 Determine selling prices for items 1.2 in order to sell and buy from other companies. 1.5 Allow students to buy and sell within groups, developing, costs, net concepts.	1.1 Sections of room, hall, etc. for privacy. Group of 3-5 per company. Sci Fi comics, magazines, journals, paperbacks, etc.	1.1 Teacher: at least 3 publishing companies for competition.
2. Discuss concept of net profit to understand how it is figured.	2.1 Discuss student jobs and monies actually made. 2.2 Discuss parents and/or selected businesses income and cost of living to determine actual cash on hand.		

MATH: Science Fiction - Grade 8
ASSIGN. SCOPE OF LESSON STATEMENT Develop understanding of how profits are figured: gross, cost, net (continued).

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
3. Simulate a business meeting of publishers bidding on a new book.	3.1 Publishing company representatives meet for strategy session. (Prepare for competitive business meeting).		
	3.2 During meeting, outline strategy, bidding limitations, and meeting goals.		
	3.3 Meet with other publishing companies and attempt to secure book contract(s) based on type of publication the group produces.		3.3 Teacher: students should be able to secure bids in variety of fields, thus enabling them to compare production costs based on type and market.

MATH: Science Fiction - Grade 8
ASSIGN. SCOPE OF LESSON STATEMENT Create and solve story problems, based on publishing company membership.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Write and solve story problems based on gross, cost, net profits.	1.1 Write 3 story problems based on membership in publishing company, reflecting relationship between, gross, cost and net. Student must use percent, multiplication division and fractions, in a problem.	1.1 Paper, pencil.	1.1 Refer to: Math Science Fiction p. 2, Objectives 1, 2, 3.

SCIENCE: Science Fiction - Grade 8

ASSIGN. SCOPE OF LESSON STATEMENT Compare and contrast science fiction predictions with existing space development.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Compare space developments in early Sci Fi writings with actual space program of today.	1.1 Select one book for whole group to read.	1.1 Book.	
	1.2 Brainstorm ideas and list on board: Early Predictions/Space Program Today	1.2 Chalkboard.	
2. Hypothesize future developments based on current readings.	2.1 Construct formal hypotheses to be sent to NASA, based on readings in Sci Fi book.		

SOCIAL STUDIES: Science Fiction - Grade 8
ASSIGN. SCOPE OF LESSON STATEMENT Compare and contrast social systems.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Compare a science fiction space colony social system with a comparable society on earth.	1.1 Based upon previous Sci Fi readings students will select one space colony and create a social system through mapping or diagrams.	1.1 Variety of Sci Fi books.	
	1.2 Given the above Sci Fi social system students will attempt to create a similar social system which depicts an earth society.		

SOCIAL STUDIES: Science Fiction - Grade 8
ASSIGN. SCOPE OF LESSON STATEMENT Develop communication skills through writing and speaking activities.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Write and deliver a speech which defends the need for law and order as opposed to anarchy in a space colony.	1.1 Students will first be taught the *STEP* speech method.	1.1 Program designed and taught by Nancy Vandeventer (Bozeman Jr. High). Workshops and materials available.	
	1.2 Given the above available experience students will deliver a 3 minute speech which defends democracy versus anarchy in a future space colony.	1.2 Video equipment and camera.	1.2 Be sure microphone on camera is close enough.
	1.3 Student speeches would be video taped and class critiques would follow.		
2. Describe and explain an ecosystem as presented through the eyes of a science fiction writer.	2.1 Review with students the elements of an ecosystem through discussion list on overhead.	2.1 Overhead projector.	
	2.2 Ask students to describe their own ecosystem.		
	2.3 Based upon the above ask students to work in pairs and prepare a description of an ecosystem which they encountered in their previous Sci Fi reading.	2.3 A variety of Sci Fi books.	
	2.4 Each pair would then present to the class their descriptions.		

ART: Science Fiction - Grade 8
ASSIGN. SCOPE OF LESSON STATEMENT Design a clothing line for use in a space colony.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Understand utilitarian side of clothing designs vs. fashion side of design.	1.1 In small groups or individually, will reflect on needs in clothing: physical laborers; desk workers; mothers; children; infant/toddler; school age; environment; and note down ideas.	1.1 Group, paper, pencil.	
	1.2 Read or study material types.	1.2 Visit fabric store, sewing manuals.	
2. Create complete clothing line for one type of individual lifestyle (See 1.1 Activity).	2.1 Sketch, complete drawings of clothing line - labeling usage.	2.1 Art paper, pencil, material samples.	

ART: Science Fiction - Grade 8

ASSIGN. SCOPE OF LESSON STATEMENT Formulate a collage based on Sci Fi story, to demonstrate color usage to show reactions.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Express emotional reaction and factual reaction to story by creating a collage.	1.1 Choose story to illustrate.	1.1 Story based on readings.	1.1 Refer to: Reading/LA Science Fiction
	1.2 Reflect on personal reaction vs. factual reaction to story, and how this can be shown in colored shapes.	1.2 Personal reactions.	
	1.3 Construct collage on 11" x 18" paper, using paper for medium: wallpaper; magazines; construction paper; paper towels, etc.	1.3 Any paper product desired or needed.	

ART: Science Fiction - Grade 8

ASSIGN. SCOPE OF LESSON STATEMENT Create linoleum or wood block cutting to develop concepts of light source, shadows, grouping for unity.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Design, in linoleum or wood cut, skyscape of colony developing concepts of shape, with light source and shadows, and unity through groupings.	1.1 Rough sketch of scene, determining light source, shadow placement, and groupings to reflect unity.	1.1 Paper, pencil.	
	1.2 Make linoleum or wood block print of sketch.	1.2 Linoleum or woodblock cutting tool.	

MUSIC: Science Fiction - Grade 8
ASSIGN. SCOPE OF LESSON STATEMENT Provide students the opportunity to create lyrics based upon science fiction.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Write the lyrics to a song with a science fiction theme.	1.1 Review through discussion, a variety of predictions presented in science fiction writing.	1.1 Background information prepared by teacher. Refer to resource list.	
	1.2 While listening to science fiction music in the background assign small groups the task of writing one verse about the theme.	1.2 Space theme music; i.e., 2001, STAR TREK, etc.	
	1.3 Groups will then share verses with total group and attempt to combine into a science fiction song.		

MUSIC: Science Fiction - Grade 8
ASSIGN. SCOPE OF LESSON STATEMENT Expose students to creative movement using a science fiction theme.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Participate in creative movement as imagination depicts theme.	1.1 Discuss how students might imagine movement in a science fiction type of story.		
	1.2 With appropriate background music, ask students to use their imagination and move about the room as they might imagine movement in a science fiction theme.	1.2 Record or tape; i.e., 2001, COSMOS, etc. Try to avoid lyrics if possible.	1.2 Move desks to outer edges of room or use gym.

HEALTH AND PHYSICAL EDUCATION: Science Fiction - Grade 8

ASSIGN. SCOPE OF LESSON STATEMENT Develop the concept of the importance of the sun to our health.

OBJECTIVE	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1. Provide an awareness that our sun provides us with Vitamin D.	1.1 Have children develop space vehicles that allow sunshine to be utilized. Children will develop a written report and an illustration to go with their report.		1.1 Important for young children and their bone development. Lack of Vitamin D causes rickets.

UNIT: OUTER SPACE

Step VI. Vocabulary

VOCABULARY KEY

Word Attack Strategy:

1. Phonics
2. Structural analysis
3. Experiential
4. Explanation related to experience
5. Sight word - exception
6. Acronym
7. Etymology
8. Homograph
9. Compound word

Level of Learning:

*	Known by teacher
**	Introduced to student
***	Reinforced or reintroduced
****	Mastered

UNIT: OUTER SPACE

Step VI. Vocabulary

VOCABULARY KEY
Page 2

Phonic Generalizations: (+ = In one syllable words or accented syllables...)

1a. +, if a word ends in a final "e" preceeded by a single consonant, the first vowel is usually long and the "e" silent.

Example: v c e

1b. +, a vowel in the final position is usually long.

Example: (c) v

1c. +, a vowel in the initial or medial position is usually short.

Example: (c) v c

1d. +, a vowel followed by an "r" is neither long nor short but "r" controlled.

Example: $\overset{r}{v}$ r

1e. +, if two vowels are adjacent, the first is usually long, the second silent.

Example: (c) v v (c)

1f. +, an "i" followed by "gh" is usually long and the "gh" silent.

1g. +, when "o" is followed by "ld" the "o" is usually long.

1h. +, pronunciation of some words can only be determined through context.

1i. syllabic (c) v/c

1j. syllabic v c/c v

1k. vowel in an unaccented syllable usually has the schwa sound.

UNIT: OUTER SPACE

Step VI. Vocabulary

SPACE TRAVELERS: GRADES K-1

astronaut	2**	astro - (star), naut - (sailor)
cosmonaut	2**	cosmo - (world), naut - (sail)
gravity	5**, 4**, 2*	grav - (heavy)
NASA	6**	
orbit	2*, 1j*, 1d**	orbi - (circle, track)
outer	5**, 3**	
planet	2*, 5**	plane - (wanderer)
pressure	1j*, 1c*, 3**	
revolve	2** (?), 4**	re - (again, back) volve - (roll, turn)
rotate	1i*, 1b*, 2*	rota - (wheel, revolve)
rover	1i*, 4**	
satellite	2*, 5**	satell - (an attendant)
solar	1i*, 1b*, 1d*, 2**	sol - (of the sun) -ar - (referring to resembling)
system	1j*, 1c*, 4**	
space	1a**, 4**	
spacecraft	9**, 4**, 1a**, 1c**	
thrust	1c**, 4**	
weightless	5, 2**	-less (without)

UNIT: OUTER SPACE

Step VI. Vocabulary

SOLAR SYSTEM: GRADE 2

astronaut	2***, astro - (star), naut - (sail)
astronomer	2**, onom - (name), -er (one who)
axis	2*, 5**, axi - (axle)
craters	1i**, 1b***, 2, 7**, crater - (bowl)
day	3**, 1e***
daytime	9**, 1e***, 1a***
Earth	5**, 3**
east	1e***, 4**
heat	1e***, 4**
Jupiter	7**, 5**, (Jupiter was chief Roman god)
launch	5**, 4**, 7*, (from ME word meaning "to hurl")
light	1f**, 3**
Mars	7**, 1d*** (planet named for Roman god of war, March also named for this god)
Mercury	7**, 1d***, 1j**, (planet named for Roman god who was a messenger with winged feet)
mythology	5**, 2**, myth - (legend), ology - (study of)
Neptune	1j**, 1c**, 7** (Roman god of sea)
nighttime	9**, 1f**, 1j**, 1a**, 3
north	1d**
orbit	2**, 1j**, 1d**, orbi - (circle, track)
oxygen	2*, 5**, 4, oxy - (sharp), gen - (producing)
planets	2**, 5**, plane - (wanderer)
Pluto	5**, 7**, (god of the dead)
revolve	2**, 4**, re - (again, back), volve - (roll, turn)
rotate	1i*, 1b*, 2*, rota - (wheel, revolve)
satellite	2*, 5**, sateu - (an attendant)
Saturn	7**, (Roman god)
seasons	1i**, 1e**, 2**, -s (a plural morpheme)
solar	1i**, sol - (of the sun)
solar system	1i*, 1b*, 1d*, 2**, sol - (of the sun), ar - (referring to resembling)
space	1a**, 4**
spacecraft	9**, 4**, 1a**, 1c**
star	1d**
south	5**, 4**
sun	1c**, 3**
sundial	9**, 1j, 1c***, 5** (dial)
telescope	2**, tele - (far), scope - (see, watch, look)
time	1a**, 3**
Uranus	7**, (planet named for Greek sky god)
Venus	7**, (planet named for Roman goddess of love)
west	1c**, 4**
year	5**, 4**

UNIT: OUTER SPACE

Step VI. Vocabulary

THE MOON: GRADE 3

astronauts	2***, astro - (star), naut - (fail)
axis	2**, 5**, axi - (axle)
Big Dipper	1
constellation	
crater	1i**, 1b***, 2, 7**, crater - (bowl)
day	3***, 1e***
earth	5***, 3***
east	1e***, 4**
full moon	
gases	
lava	
light year	1f***, 3***, 5***, 4*** (year)
lunar	
moon	
new moon	
north	1d**, 4
North Star	1d**, 1d**
orbit	2**, 1j**, 1d**, orbi - (circle, track)
phase	
planet	2*, 5**, plane - (wanderer)
planetarium	
revolving	2**, 4**, re - (again, back), volve - (roll, turn)
rotating	1i**, 1b**, 2**, rota - (wheel, revolve)
satellite	2**, 5**, satell - (an attendant)
scientist	
seas	
seasons	1i**, 1e**, 2**, -s - (plural morpheme)
south	5***, 4***
spaceship	9**, 4**, 1a**, 1c**
spin	
star	1d**
sun	1c***, 3***
telescope	2**, tele - (far), scope - (see, look)
twinkle	
waning	
waxing	
weather	
west	1c**, 4**
year	5***, 4***

UNIT: OUTER SPACE

Step VI. Vocabulary

GALAXIES: GRADE 4

elliptical	4**	
galactic	2**, 5**	gala(x) - (milky), -tic - (belonging to)
galaxy	2**, 5**	gala(x) - (milky)
globular	2***, 1i***	glob - (a ball), -ar - (like)
cluster	1j****, 1c****	
interstellar	2**	inter - (between), stell - (star)
matter	1j****, 1c****	
light	1f****	
year	5****	
milky	1c***, 2**	-y - (like, resembling)
way	1e***	
nebulae	2**, 5**	nebul - (cloud)
nucleus	2***	nucle - (a little nut)
spiral	2**	spir - (coil)
star	1d****	

UNIT: OUTER SPACE

Step VI. Vocabulary

COMETS: GRADE 5

aggregate	2** (ag - intensifier), (greg - flock, group, or herd), (-ate - state of).
coma	1i***, 1b***, 1k***, 7** (coma may mean "deep sleep", but is also related to roof for "head."
comet cloud	5***, 7**, (derived from Greek word, "to wear long hair," literally a "long-haired star").
density	2**, ("dens" meaning "thick" and "ity" meaning "state of."
ellipse	7*, (ellip - means "fall short of", and ellipse in mathematics falls short of the angle made by intersecting plane.
globular	
hyperbola	2**, ("hyper" = "overly"; "bola" = "to throw").
incandescent	2**, (in = thoroughly; cand = white).
mass	
meteroids	
nebulous	
nucleus	
parabola	
perihelion	
radiation	
volatile	
volume	

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UNIT: OUTER SPACE

Step VI. Vocabulary

EXPLORATION: GRADE 6

adaptive	
analyze	
calculate	
categorize	
characteristics	
chord	1d***, 2** = string of musical instrument
conducive	2**, 1j***, 7 con - with, together - due = to lead, -ive = inclination to.
conversion	2**, con - with, together, thoroughly, versi = turn or change
congruent	
convert	2**, con = with, ver = change
data	5**, 7* (the plural of Latin word datrum, derived from word = given)
dimensional	
dispute	
ecological balance	
ecosystem	2**, eco = house or abode, system = system, 7** (an ecological community)
encounter	
environment	
futuristic	
gravity	
interaction	2**, inter = between, act = action or do, -ion = act of
interdependence	2**, inter = between, pen = hand, de = from, ence = state of
interpret	2**, inter = between, pret = 7* negotiate, to sell or to tell
interrelationship	
isometrics	2*, iso - (same), meter - (measure)
linkage	5**, 2** link = ring, age = collect or connect
NASA	6****, (National Aeronautics Space Administration)
preventive	
radius	
recognize	
sensory	
speculate	2**, spec = to look or see, ate = to make or apply
theory	5**, 1d***, 7* (derived from Greek = contemplate or observe)

UNIT: OUTER SPACE

Step VI. Vocabulary

ASTRONOMY - GRADE 7

Andromeda Galaxy
angle
asteroid
astrology
astronomer
astronomical unit
astronomy
astrophysics
axis
Big Dipper
binary star
black hole
celestial equator
celestial pole
comet
constellation
corona
cosmologist
declination
eclipse
ecliptic
equinox
evening star
galaxy
Galileo
Halley's Comet
International Date Line
lens
light year
Little Dipper
luna
navigation
nebula
North Star
objective lens
observatory
orbit
parallax
planetarium
planetoids
pulsar
Quasar
refractor
reflector
revolve
rotate
satellite
scale model
season
solar flare
solar system
solstice
spacecraft
spectogram
Sputnik I
sundial
sun spot
supernova
telescope
twilight
universe
white dwarf
zodiac

UNIT: OUTER SPACE

Step VI. Vocabulary

SCIENCE FICTION: GRADE 8

anarchy

binder

colony

critique

democracy

ecosystem

encounter

facts

fantasy

fiction

gross

imagination

lyrics

net

opinion

printer

profit

typesetter

utilitarian

verse

weightlessness

UNIT: OUTER SPACE

Step VII. Resource List

SPACE TRAVELERS: GRADES K-1

Math/Science Resource Center

- SCIENCE FOR THE ELEMENTARY SCHOOL, Victor, Edward - MacMillan, 1980
- AEORSPACE CURRICULUM GUIDE, Mass. Dept. of Ed and NASA, 1968

General

- RESOURCES FOR CREATIVE TEACHING IN EARLY CHILDHOOD EDUCATION, Flemming, Hamilton and Hicks, Harcourt Brace Jovanovich, Inc., 1977

Other Resources

- Teacher's Packet (write & ask for it).

NASA Education Office
Ames Research Center
Moffett Field, CA 94035

UNIT: OUTER SPACE

Step VII. Resource List

SOLAR SYSTEM: GRADE 2

Berkley, Ethel S., SPACE
Greene, Carla, I WANT TO BE A SPACE PILOT/SCIENTIST
Lely, James, STAR TREK
Lewellen, John, YOU AND SPACE NEIGHBORS
Moncure, Jane Belk, MAGIC MONSTERS LEARN ABOUT SPACE
Seevers, James A., READ ABOUT SPACE
Wassermann, Jack and Selma, MOONBEAM FINDS A MOON STONE
Lord, Beman, THE DAY THE SPACESHIP LANDED
Victor, Edward, SCIENCE FOR THE ELEMENTARY SCHOOL
Freeman, Ira and Mae, THE SUN, THE MOON AND THE STARS
Moche', Dinah L., MY FIRST BOOK ABOUT SPACE - A Question and Answer Book
Branley, Franklyn M., THE SUN: OUT NEAREST STAR
Schecter, Darrow, I CAN READ ABOUT PLANETS
Tannenbaum, Harold E., EARTH AND SPACE
Radley, Gain, THE NIGHT STELLA HID THE STARS
Freeman, Mae Blacker, DO YOU KNOW ABOUT STARS?
Santrey, Laurence, DISCOVERING THE STARS
Branley, Franklyn, THE MOON SEEMS TO CHANGE
Brown, Margaret Wise, GOODNIGHT MOON
Knight, David C., LET'S FIND OUT ABOUT MARS
Freeman, Don, SPACE WITCH
Fields, Alice, STARS AND PLANETS
Leley, James, BATTLESTAR GALACTICA
Nephew, William, SPACE
Todd, Ruthven, SPACE CAT
Todd, Ruthven, SPACE CAT MEETS MARS
Montgomery, R.A., SPACE AND BEYOND
Kroll, Steven, SPACE CATS
Slobodkin, Louis, THE SPACE SHIP UNDER THE APPLE TREE

Step VII. Resource List

SOLAR SYSTEM: GRADE 2 CONTINUED

Bulletin Board Set by TREND
  Solar System T-804 $4.95

Education Office
% Garth Hull
NASA Ames Research Center
Moffett Field, CA 94035

Good Apple Newspaper, March, 1984 (Model of Solar System)

Troll Associates - Filmstrip and Cassette, "The Sun"

SVE Filmstrip, "Moon, Sun, and Stars"

SCIENCE MATH RESOURCE CENTER - Montana State Unversity

- Elementary Science Study (ESS) - Earth Science
  - Where Was the Moon?
  - Where Is the Moon?
  - Daytime Astronomy

- McGraw Hill
  - Activity Cards and Science Modules
  - Day and Night

- Milliken Publishing Company
  - Transparencies and Duplicating Books
  - Stars and Space Science
  - The Solar System
  - Earth, Sun, Stars
  - Outer Space
  - Space Travel

- Little, Brown and Company
  - Brown Paper School Books
    - The Night Sky Book
    - The Reasons for Seasons

- National Geographic Society
  - The University (Filmstrip and Cassette)

- Games:
  - Planet Management Game

UNIT: OUTERSPACE

Step VII. Resource List

THE MOON: GRADE 3

Bozeman Public Library (629.4):

Branley, Franklin, MAN IN SPACE TO THE MOON
Friskey, Margaret, THE TRUE BOOK OF THE MOONWALK ADVENTURE
Fields, Alice, SATELLITES
Colby, C.B., ASTRONAUTS IN TRAINING

Other Books:

Ronan, Colin and Storm Dunlap, THE GOLDEN BOOK OF ASTRONOMY
Dietz, David, ALL ABOUT SATELITES AND SPACE SHIPS
Vaughan, Jenny, ON THE MOON
Petty, Kate, SPACE SHUTTLE

Other Resources:

1. NASA
   Ames Research Center
   Moffett Field, CA 94035
   (Teacher's Packet)

2. A current map of the night sky can be found each month in the magazine SCIENCE AND CHILDREN.

3. NATIONAL GEOGRAPHIC - "The Universe" - Filmstrip and Cassette

MSU - Science/Math Resource Center

1. Victor, Edward, SCIENCE FOR THE ELEMENTARY SCHOOL
2. Massachusetts Dept. of Education, AEROSPACE CURRICULUM RESOURCE GUIDE, NASA
3. ESS It - "Where Is The Moon"; "Playtime Astronomy."
4. Webster Division, McGraw Hill Book Company
   - Time, Space and Matter
   - The Moon's Face
   - The Lunar First

UNIT: OUTER SPACE

Step VII. Resource List

GALAXY: GRADE 4

THE NEW EXPLORING SCIENCE, Blecha, Gega, Green, Laidlaw Brothers Publishers

SUN, STARS, IN BETWEEN, Apolo-Soyuz Pamphlet No. 3 NASA Washington, D.C. 70546, Oct. 1977.

GALAXIES AND THE UNIVERSE, The University of Illinois Astronomy Program Book 6

ASTRONOMY MADE SIMPLE, Degani, Meir H.

Education Office
% Garth Hull
NASA Ames Research Center
Moffett Field, CA 94035
(Teacher's mailing list for original teacher's packet).

UNIT: OUTER SPACE

Step VII. Resource List

COMETS: GRADE 5

Science-Math Resource Center:

FRONTIERS IN ASTRONOMY - "SCIENTIFIC AMERICAN"	433.8 F/10-12 1970	pp. 98-99
HIGHLIGHTS IN ASTRONOMY, Hoyle, Fred	433.8 F/10-12 1975	pp. 84-92
NEW FRONTIERS IN ASTRONOMY - "SCIENTIFIC AMERICAN"	433.8 F/10-12 1975	pp. 36-45
VISUAL MASTERS ON ASTRONOMY, Walch, J. Weston	433.8 WW/1-6 1973t	
THE SOLAR SYSTEM - "SCIENTIFIC AMERICAN"	433.86 F/10-12 1975	p. 132
ASTRONOMY MADE SIMPLE, Degani, Meir H.	433.86 Do/10-12 1976	p. 192-196
COSMOS, Sagan, Carl	433.86 RH 1980	
COMET KOHOUTEK 1973-74, Chapman, Robert D. (A teacher's guide w/student activities)	433.85 NASA/10-12 1973	

"Kohoutek" - NATIONAL GEOGRAPHIC, Weaver, Kenneth
Vol. 146, #2, pp. 214-223.

"Earth's Most Mysterious Visitor" - THE OLD FARMER'S ALMANAC 1985
Gropman, Donald and Mirvis, Kenneth pp. 42-46.

Teacher's Resource Center:

"The Solar System" - GOOD APPLE NEWSPAPER, March 1984
Issue 54, Vol. II, No. 4

UNIT: OUTER SPACE

Step VII. Resource List

EXPLORATION: GRADE 6

Education Office
% Garth Hull
NASA Ames Research Center
Moffet Field, CA 94035
(Request teacher's packet)

Science-Math Resource Center:

LIVING AND WORKING IN SPACE 433.87
Skylab Experiments NASA
NASA Vol. 7 1973

CHARTING THE UNIVERSE 423.86
UI

THE WORLD OF TOMORROW
Aeorspace Activities

UNIT: OUTER SPACE

Step VII. Resource List

ASTRONOMY: GRADE 7

Science-Math Resource Center:

ASTRONOMY - EXAMINING YOUR ENVIRONMENT, MacBean, J.C.	414.1 HRW/4-6 1971
A UNIVERSE TO EXPLORE, Ewers, Ralph	421.12 HRW/7-9 1976
SCIENCE FOR THE ELEMENTARY SCHOOL, Victor, Edward C.	836.46 MacM 1980

ASTRONOMY EVEN FOR YOU, Stockton, Dorothy

THE UNIVERSE, National Geographic Society (Filmstrips, casssettes, T.E.)

J.L.M. Visuals (slides)
- Optical Sky Phenomena
- Optical Telescopes

CHEMISTRY BETWEEN THE STARS

UNIT: OUTER SPACE

Step VIII. Evaluation

The following outlines a suggested formal evaluation format to utilize when teaching with this unit.

The blank form is intended to be reproduced for multiple use. The completed form is a sample of how to use the blank form.

EVALUATION WORKSHEET

Unit: ____

Sub-unit: ____________________________________

Core Area: ___________________________________

Student's Name: _______ _______ _______ _______ _______

Instructional Objectives	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	TEACHER NOTES

1. Does not demonstrate competence
2. Demonstrates competence
3. Mastered

EVALUATION WORKSHEET

Unit: Gallatin History - Past to Present

Sub-unit: Wildlife K-1

Core Area: Math/Science

Instructional Objectives	**Student's Name:** Jon H. **1 2 3**	Anne H. **1 2 3**	Kristin L. **1 2 3**	Ray S. **1 2 3**	Susan T. **1 2 3**	**TEACHER NOTES**
Create verbal addition and subtraction problems.	2	2	3	1	2	Used mat organizer
Develop counting skills using manipulatives.	3	3	3	2	3	Used plastic anima then chips.
Construct a bar graph.	2	2	2	2	3	Only 2 variables begin w/concrete graph. Expand nex time to pictorial.
Explore animal tracks.	2	2	2	2	2	Walking fieldtrip plus pets.
Categorize animals according to various characteristics.	2	1	2	1	2	Suggest extended work w/classifying attribute blocks for 1's.
Discuss idea that nature furnishes shelter for animals.	3	2	2	2	3	Pictures of animal and their shelters really helped.

1. Does not demonstrate competence
2. Demonstrates competence
3. Mastered

BEST COPY AVAILABLE

Appendix A: Unit Theme Participants

Mary Jean Bunting
Kathy Butts
Nancy Drusch
Connie Gates
Lois Hiebert
Carol Lark

UNIT: OUTER SPACE

Appendix B: Alternative Sub-units

Constellations

NASA

Science Exploration in Space

Energy

Physical Composition in Space